

LOW-LEVEL RADIOACTIVE WASTE

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED EIGHTH CONGRESS
SECOND SESSION
TO
RECEIVE TESTIMONY REGARDING ISSUES RELATED TO LOW-LEVEL
RADIOACTIVE WASTE

SEPTEMBER 30, 2004



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LOW-LEVEL RADIOACTIVE WASTE

THURSDAY, SEPTEMBER 30, 2004

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 10:47 a.m. in room SD-366, Dirksen Senate Office Building, Hon. Pete V. Domenici, chairman, presiding.

STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. The hearing will come to order. I want the witnesses to know that when we arranged this hearing we certainly had no way of knowing what a difficult floor situation we had and the difficulty we have with reference to our time. There is a bill on the floor which you all have read about, that is extremely difficult, on the reform of the CIA. Some of us, maybe Senator Bingaman, maybe I, will have to excuse myself.

So we want to start by asking you, by first suggesting to you, that you prepared terrific testimony. It has been reviewed and we want you to abbreviate your testimony so that a few questions can be asked. If you do that, it will be extremely helpful.

I have a detailed explanation of this problem and what you are going to tell us and various views. I do not think I am going to read it. I am just going to say that I am very—I feel very good about the fact that we are having hearings about an issue that is not a tomorrow issue; it is an issue that will not be here for a few years. But we do not want to wait to try to solve it until the date when our hospitals and all those who produce the kind of wastes that we are talking about here has no place to go except on-site. So we want to pursue with some degree of earnestness in advance some solutions to this. That is why we are here.

So with that, I will put my statement in the record so as to abbreviate my remarks. They are very exciting remarks. Anybody that does not get to hear them, you certainly have been short-changed this morning. Nonetheless, we will call on Senator Bingaman, and certainly what I have said does not apply to you, Senator.

[The prepared statements of Senators Domenici, Akaka, and Feinstein follow:]

PREPARED STATEMENT OF HON. PETE V. DOMENICI,
U.S. SENATOR FROM NEW MEXICO

This oversight hearing of the Energy and Natural Resources Committee on the disposal of low-level radioactive waste shall come to order.

The purpose of this hearing is to both evaluate and learn from a recent report issued by the Government Accountability Office on the potential disposal shortage for low-level radioactive waste in this country. While not an immediate problem, we must now pay close attention to prevent a potential future crisis.

The GAO found that low-level radioactive waste disposal volumes increased 200 percent between 1999 and 2003, primarily due to this waste being shipped to commercial disposal facilities by the DOE.

In 2008, which is not very far off, the Barnwell disposal facility in South Carolina is set to close to all states outside of its compact, some 34 states. The generators in these states will not have a disposal facility to send their waste. An example is that universities and hospitals that deal with nuclear medicine will have to find and pay for storage space on their campuses and buildings away from students, faculty and staff. One can only imagine that further regulatory expense and burden will be placed on these institutions as wastes build up with no where to go. This is something we need to prevent.

I just referred to a "compact," let me explain that term. In 1980, Congress enacted the Low-Level Radioactive Waste Policy Act, which required states to dispose of their own low-level waste. This act encouraged states to form interstate compacts, or regional associations of states, for the purpose of low-level radioactive waste disposal. The thinking was that this legislation would enable states to create additional low-level waste sites to prevent a possible shortage of disposal space. There were three disposal sites for low-level waste in 1980, today, there are still three. This act in 1980 was supposed to prevent the situation we are facing in 2008—a shortage of disposal space.

Furthermore, I am concerned as I am sure my colleagues are that the GAO had to rely on information from the three commercial disposal operators after they discovered that the information from the national low-level radioactive waste database, maintained by DOE and financed by tax payer money, was inaccurate and unreliable.

We will also conduct oversight today on another GAO report requested by my colleague Senator Akaka. This report deals with DOE programs to ensure recovery and safe disposal of radioactive sources to assure that they do not become threats to public health and safety through either carelessness or overt actions.

Testifying today is Ms. Christine Gelles, Director of the Office of Commercial Disposition Options in the Office of Environmental Management at the DOE;

Mr. Edward McGinnis, Director, Office of Global Radiological Threat Reduction in the National Nuclear Security Administration in the DOE;

Ms. Robin Nazzaro, Director of the Natural Resources and Environment Team in the Government Accountability Office. Ms. Nazzaro, your team is the author of the reports, we will be curious to discuss your findings today;

and

Dr. Alan Pasternak, the Technical Director of the California Radioactive Materials Management Forum. Dr. Pasternak, I believe you testified before this committee on October 8, 1985, on the issue of low-level radioactive waste disposal, welcome back.

PREPARED STATEMENT OF HON. DANIEL K. AKAKA, U.S. SENATOR FROM HAWAII

I thank Chairman Domenici for scheduling this timely hearing on the security and disposal of low-level radioactive waste. There are a number of concerns and issues which need to be addressed regarding the various types of low-level radioactive waste, and I look forward to hearing the testimony of the witnesses today.

Since September 11, 2001, we have faced the possibility that a terrorist could use a so-called "dirty bomb" in an attack against the United States. A dirty bomb combines conventional explosives with highly radioactive materials. If set off in the downtown of a major city, it could contaminate a wide area with radiation and cause death and destruction. Panic and substantial economic damage could also result.

As ranking member on the Subcommittee on Financial Management, the Budget, and International Security of the Committee on Governmental Affairs, I asked the Government Accountability Office (GAO) to investigate what actions were needed to ensure continued recovery of unwanted sealed radioactive sources. They completed an excellent report, "Nuclear Proliferation: DOE Action Needed to Ensure Continued Recovery of Unwanted Sealed Radioactive Sources," GAO-03-483, in April 2003, focusing on greater-than-Class-C (GTCC) sealed sources.

GTCC radiological sources are the "high end" of the continuum of low-level radioactive waste. In other words, Class A, B, and C wastes can generally be disposed of at existing commercial disposal facilities. But wastes that exceed the Nuclear Regulatory Commission's criteria for Class C, known as greater-than-Class-C

wastes, are potent enough that they generally cannot be disposed of at existing facilities. GTCC wastes must meet progressively more stringent requirements for disposal.

GAO found a pattern of inconsistency in the 17 years since the enactment of P.L. 99-240, the Low-Level Radioactive Waste Policy Amendments of 1985. The Act required the Department of Energy to provide a facility for disposing of all GTCC radioactive waste, including GTCC sealed sources that are no longer wanted by their owners. There is no permanent disposal site yet. Although DOE has said that the facility will be up and running by 2007, it seems unlikely as they have yet to select a potential site, let alone begin construction.

In 1999 DOE created the Off-Site Source Recovery Project (OSRP) to recover unwanted GTCC sealed sources and temporarily house them at Los Alamos National Laboratory. According to GAO, approximately 10,000 GTCC sealed sources from about 160 sites across the U.S. have been recovered to date. While this is an achievement, the job is not done. Approximately 8,000 sources still remain in insecure facilities.

At the time of the GAO study, the OSRP could not recover any additional GTCC sealed sources containing plutonium-239, one of the most highly radioactive and potent sources of radioactivity, because Los Alamos did not have space to meet DOE's security standards for storing these sources.

Since GAO released the report, DOE found room to store approximately 250 of the 400 sources containing plutonium-239 documented in the report. However, the number of known sources needing storage has doubled since 2003. As a result, there are still many holders of unwanted sources containing plutonium-239, most of which are universities, that must properly secure until space becomes available.

In May 2003 I introduced S. 1045, the Low-Level Radioactive Waste Act of 2003, and would like to acknowledge the support of my cosponsors, Senators Bingaman and Landrieu. The legislation would require DOE to report to Congress on the current situation and future plans for the disposal of GTCC radioactive waste and the cost and schedule to complete an environmental impact statement and record of decision on a permanent disposal facility for GTCC radioactive wastes. Finally, it would require DOE to deliver to Congress a plan to provide for the short-term recovery of GTCC radioactive waste until a permanent facility is available. This legislation parallels the recommendations of the GAO report. Its provisions are critical to being able to secure sealed sources.

As Congress works diligently this week to restructure the intelligence community, it must be acknowledged that there are many pieces to the homeland security puzzle. We must continue to work on national security efforts not detailed in the 9/11 Commission Report to ensure the security of our homeland, including finding ways to secure radioactive sources in this country that could be used by terrorists.

Mr. Chairman, I look forward to the testimony of the witnesses on this topic.

PREPARED STATEMENT OF HON. DIANNE FEINSTEIN, U.S. SENATOR FROM CALIFORNIA

Thank you, Mr. Chairman, for holding this hearing today. I would especially like to welcome Dr. Alan Pasternak from the California Radioactive Materials Management Forum.

I am interested in several issues being raised today:

- Are there adequate disposals for low-level radioactive waste?
- Is it safe to store the waste on-site at the facilities that create the waste (such as hospitals, universities, and industrial facilities)?
- Is the Department of Energy doing enough to track, package, secure, and dispose of Greater than Class C waste?

I am particularly concerned with what I have learned about Greater than Class C (GTCC) waste, which includes radioactive waste from medical isotopes and other industrial uses. I am concerned because this waste is not being safely secured—it appears that the Department of Energy has not abided by the Low-Level Radioactive Waste Policy Amendments of 1985.

The Act required the Department of Energy to provide a facility for disposing of all GTCC radioactive waste. There is no permanent disposal site yet. Although DOE has said that the facility will be up and running by 2007, it seems unlikely as they have yet to select a potential site, let alone begin construction.

Approximately 8,000 sources of GTCC are still in non-secure facilities. At least 150 sealed sources of plutonium-239, one of the most highly radioactive and potent sources of radioactivity, are not housed in a secure facility.

Given what we all know about the threats that our nation faces from al Qaeda, I am extremely concerned that the lack of adequate security may create a real vulnerability in our nation's homeland security efforts. I look forward to hearing from the Department of Energy on this specific issue.

Thank you Mr. Chairman.

**STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR
FROM NEW MEXICO**

Senator BINGAMAN. Well, thank you very much, Mr. Chairman. I will also just put my statement in the record, with one exception. I did want to mention that Senator Akaka, who is not able to be here today, has presented a bill, S. 1045, which proposes to strengthen the program to collect sealed sources which are greater than class C. This is a bill that I have been interested in. I would be interested in hearing from the witnesses about DOE's plans for disposing of the non-defense greater than class C waste and their views on this legislation. I know Senator Akaka wanted us to ask specifically about that bill in his absence.

Thank you very much, Mr. Chairman.

[The prepared statement of Senator Bingaman follows:]

PREPARED STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR
FROM NEW MEXICO

Let me thank the witnesses for coming to today's hearing and taking time today to testify.

Low-level radioactive waste is a topic that is important for cleaning up our former atomic weapon sites and in insuring that there is a disposal path for our nuclear power industry and the many isotopes and sealed sources used commercially.

The GAO notes that in 2003, 12 million cubic feet of low-level waste were permanently disposed of—a 200 percent increase since 1999. 99 Percent of the volume was class A waste, material that will decay in about 100 years, but 78 percent of that was from DOE clean up program, or roughly 9.2 cubic million feet. The DOE program is slated to continue its clean up operation well past the year 2035—so I would like to know if the DOE knows the total volume of low-level waste they expect to generate and whether it will impact the commercial disposal operations.

I would like to know the administration's opinion of a bill Senator Akaka has submitted to this committee, S. 1045, which proposes to strengthen the program to collect sealed sources which are Greater Than Class C. I believe his bill can help strengthen this very important program in a post 9/11 world.

With respect to this collection program, I would like to know DOE's plans for disposing of the non-defense Greater Than Class C waste, for which the NRC requires a geologic repository unless a waiver is granted.

With that let me welcome the witnesses and I look forward to their testimony.

The CHAIRMAN. Thank you very much, Senator Bingaman.

I also want to say Senator Akaka has been very interested in pursuing this whole issue and asked for one of the major studies that led to one of the panelists being here. We thank him for that, because he has been on top of the issue.

I am going to start in the order that you all are listed in my information agenda. So we are going to start with the Director of the Office of Commercial Disposition Options of the Office of Environmental Management, Department of Energy, Ms. Christine—GELL-ess?

Ms. GELLES. Very good.

The CHAIRMAN. Wow. You do not know how badly I handle names, so it must be that you have a very easy name.

[Laughter.]

The CHAIRMAN. Proceed, please.

**STATEMENT OF CHRISTINE GELLES, DIRECTOR, OFFICE OF
COMMERCIAL DISPOSITION OPTIONS, OFFICE OF ENVIRON-
MENTAL MANAGEMENT, DEPARTMENT OF ENERGY**

Ms. GELLES. Certainly. Good morning, Mr. Chairman, Senator. I am happy to be here today to discuss with you the Department of Energy's perspective on the recent Government Accountability Office report, "Low-Level Radioactive Waste: Disposal Availability Adequate in the Short Term, but Oversight Needed to Identify Any Future Shortfalls."

I am a career employee with the Office of Environmental Management, serving since December 2003 as the Director of the Office of Commercial Disposition Options. My office's functions include the statutory responsibilities assigned to the Department of Energy in the Low-Level Radioactive Waste Policy Act of 1980, as amended. Specifically, the Department is required to provide continuing technical assistance to the States and the compacts. Currently, this assistance is provided through the collection and dissemination of commercial low-level radioactive waste disposal information in an on-line data base known as the Manifest Information Management System or MIMS.

Our interactions with the States and regional disposal compacts are conducted primarily through our association with the Low-Level Radioactive Waste Forum, Incorporated, an independent, not-for-profit organization whose members include the States and regional compacts.

Additionally, my office maintains contacts with commercial firms to ensure that a wide range of waste treatment and disposition options are available to support the Department's efforts to accelerate the cleanup of the former weapons complex. The Department currently utilizes commercial disposal for some low-level and mixed low-level waste streams in cases that it determines to be cost effective or in the best interest of the Department.

We believe the GAO's report presents a fair appraisal of the current status of commercial low-level radioactive waste disposal. We agree that disposal capacity for commercial low-level waste is sufficient in the near term and that there are significant uncertainties regarding capacity for Class B and C low-level waste after 2008, the forecast date in which the Barnwell facility in South Carolina is scheduled to cease receiving non-compact waste. We continue to monitor the status of commercial disposal capacity consistent with our statutory responsibilities because this capacity supports our accelerated cleanup objectives.

During their review, the GAO determined that the information contained in the MIMS data base was unreliable and the report included a recommendation that the Secretary of Energy halt dissemination of information contained in the MIMS database as long as it included data that they characterized as having "internal control weaknesses" and that represented "shortcomings in its usefulness and reliability." The Department disagreed with that recommendation and has kept the information available to the public with a cautionary notice and a reference to the GAO report posted on our Internet web site. It is our belief that halting dissemination of this information would evoke sharp criticism from the States and compacts because many of them find the information useful to sup-

port their operations. Further, a majority of the users do not appear to agree with the GAO's conclusions about the quality of the data. Strong support for the Department's activities in the MIMS data base was expressed as recently as March 2004 in a resolution from the Low-Level Radioactive Waste Forum.

In response to the GAO recommendations, we are taking steps to fix erroneous data as described in the letter that we sent to you on September 2, 2004. We are working with the responsible commercial disposal site operators to identify and update those records by the end of this calendar year. Just last week, members of the forum pledged their assistance to identify inaccuracies in the existing data and will support our ongoing efforts to validate the data. We intend to keep our cautionary notice posted while we complete these improvements. These actions will correct the deficiencies in the MIMS data base and ensure that we continue to support the needs of the States and regional disposal compacts.

At this time I would like to add one thing to the testimony submitted to the committee. It regards the other GAO report reviewed in this hearing, "DOE Action Needed to Ensure Continued Recovery of Unwanted Sealed Radioactive Sources." Mr. McGinnis, the witness from the National Nuclear Security Administration, will address most of the actions taken by the Department to respond to GAO's recommendations in the report. However, I would like to briefly discuss GAO's recommendation that the Department initiate a process to develop a permanent disposal facility for greater-than-Class-C radioactive waste and that the Secretary develop a plan that assigns responsibility for developing the facility, as well as other considerations.

As Mr. McGinnis reported in his written testimony, the Office of Environment, Safety and Health has initiated development of an environmental impact statement under the National Environmental Policy Act (NEPA), to analyze the range of reasonable disposal alternatives. Yesterday the Department determined that the Office of Environmental Management would have the programmatic lead for the Department's responsibilities in this area. Accordingly, Environment, Safety and Health will also assume the lead in the preparation of the environmental impact statement, although the Office of Environment, Safety and Health will continue to be involved in an advisory capacity, as is the Department's usual practice in the preparation of NEPA documents. This is an important and a challenging assignment and we look forward to working with this committee in doing our best to fulfill it in a responsible and thoughtful fashion.

I would be happy to answer any questions you have.

[The prepared statement of Ms. Gelles follows:]

PREPARED STATEMENT OF CHRISTINE GELLES, DIRECTOR, OFFICE OF COMMERCIAL DISPOSITION OPTIONS, DEPARTMENT OF ENERGY

Mr. Chairman and members of the Committee, I am happy to be here today to discuss with you the Department of Energy's perspective on the recent Government Accountability Office (GAO) report *Low-Level Radioactive Waste, Disposal Availability Adequate in the Short Term, but Oversight Needed to Identify Any Future Shortfalls*. I am a career employee in the Office of Environmental Management, serving since December 2003 as Director of the Office of Commercial Disposition Options.

My office's functions include the statutory responsibilities assigned to the Department of Energy in the Low-Level Radioactive Waste Policy Act of 1980, as amended. Specifically, the Department is required to provide continuing technical assistance to the States and compacts. Currently, this assistance is provided through the collection and dissemination of commercial low-level radioactive waste disposal information in an on-line data base, known as the Manifest Information Management System or MIMS. Our interactions with the states and regional disposal compacts are conducted primarily through our association with the Low-Level Radioactive Waste Forum, Inc., an independent non-profit organization whose members includes states and compacts.

Additionally, my office maintains contacts with commercial firms to ensure that a wide range of waste treatment and disposition options are available to support the Department's efforts to accelerate the cleanup of the former weapons complex. The Department currently utilizes commercial disposal for some low-level and mixed low-level waste streams, in cases that it determined to be cost effective and in the best interest of the Department.

The GAO initiated this review in August 2003, shortly before the implementation of the Office of Environmental Management's reorganization and the formation of the Office of Commercial Disposition Options. Therefore, other EM personnel were involved in the earliest phases of the report. However, since December 2003, my staff and I worked closely with GAO staff throughout the completion of the review and the compilation of this report. We believe the report presents a fair appraisal of the current status of commercial low-level radioactive waste disposal. We agree that disposal capacity for commercial low-level waste is sufficient in the near term, and that there are significant uncertainties regarding capacity for Class B and C low-level waste after 2008—the forecast date for when the Barnwell facility in South Carolina will cease to receive non-compact wastes. We continue to monitor the status of commercial disposal capacity, consistent with our statutory responsibilities, because this capacity supports our accelerated cleanup objectives.

During their review, the GAO staff determined that the information contained in the MIMS database was unreliable, and the report included a recommendation that the Secretary of Energy halt dissemination of information contained in the online database as long as it contained what was characterized as "internal control weaknesses" and "shortcomings in its usefulness and reliability." The Department disagreed with the recommendation, and has kept the information available to the public, with a cautionary notice and reference to the GAO report posted on the Internet web site. It was our belief that halting dissemination of this information would evoke sharp criticism from states and compacts because many of them find the information useful to support their operations. Further, the majority of the users do not appear to agree with the GAO's conclusions about the quality of the data. Strong support for the Department's activities on MIMS was expressed as recently as March 2004 in a resolution from the Low-Level Radioactive Waste Forum.

We also disagreed with GAO's suggestion that the database be expanded to include additional information, such as waste inventories at commercial generator sites or volume reduction. The Department does not have access to this information, and it is not apparent that the users of the MIMS system agree that the information is needed. Such modifications to the system would be costly to obtain and validate and would provide questionable value to the users.

In response to the GAO report recommendation, we are taking steps to fix the erroneous data as described in a letter from the Acting Assistant Secretary for Environmental Management to you on September 2, 2004. We are working with the responsible commercial disposal site operators to identify and update those records by December 31, 2004. Just last week members of the Low-Level Radioactive Waste Forum pledged their assistance to identify inaccuracies in the existing data and support ongoing efforts to validate data. We intend to keep our cautionary notice posted on the Internet web site until these efforts are complete. These actions will correct deficiencies in the MIMS and ensure we continue to support the needs of the states and regional disposal compacts.

I would be happy to answer any questions you have.

The CHAIRMAN. Thank you very much.

We now have Senator Larry Craig, who has been interested in all matters nuclear, and we thank him very much for his presence. Do you want to make any comments, Senator?

Senator CRAIG. I am here to listen.

The CHAIRMAN. Fine, OK.

We are going to now go to you, Mr. McGinnis. Your position is the Director of the Office of Global Radiological Threat Reduction of the NNSA, Department of Energy.

Mr. MCGINNIS. That is correct.

The CHAIRMAN. Would you please abbreviate your testimony. As I indicated, we are aware of it and we have some questions for you. Please proceed.

STATEMENT OF EDWARD G. MCGINNIS, DIRECTOR, OFFICE OF GLOBAL RADIOLOGICAL THREAT REDUCTION, NATIONAL NUCLEAR SECURITY ADMINISTRATION, DEPARTMENT OF ENERGY

Mr. MCGINNIS. I will do so. Thank you, Mr. Chairman and members of the committee, for the opportunity to testify on the Department of Energy's radiological recovery efforts within the United States. With your permission, I would like to submit my statement for the record and just make a few remarks.

First let me just say that DOE's radiological source recovery program has made significant progress in its efforts to accelerate and expand. This progress clearly shows how the Department has effectively addressed and exceeded constructive recommendations made by the Government Accountability Office in its April 2003 report.

Before I briefly describe some of our accomplishments, I would like to say a few words about the radiological threat we are addressing. The threat posed by radiological materials in the United States against national security is real and needs to be addressed, which is why Secretary Abraham, this administration, and Congress have taken important steps to increase the threat reduction efforts with greater priority, increased funding, and expanded authority.

A lesson learned from 9/11 is that common tools used in our society, such as commercial airliners, can be used by terrorists in devastating ways. Radioactive materials used in medicine, industry, and educational research are no exception. The effects of a so-called dirty bomb in public places are well documented and describe substantial economic impacts, depending on the isotope and other related factors. These impacts would likely result in cleanup costs and area denial for extended periods of time.

Use of radioactive sources are widespread and include cancer treatment, blood and food irradiation, education, research, oil exploration, and other applications. Given their widespread use, strong oversight by the Nuclear Regulatory Commission and the Department of Energy's recovery of high-risk radioactive sources is critical.

The GAO provided a fair and balanced review of the DOE's off-site source recovery program, which has contributed to substantial improvements. The GAO's five recommendations are: giving higher priority to the off-site source recovery program, ensuring adequate resources for the program, providing storage space for plutonium 239, strontium 90, and cesium 137, initiating the process to develop a disposal facility for greater-than-class-C wastes, and ensuring the continued recovery of greater-than-class-C sources.

I am pleased to report that DOE has completed action on three of these recommendations. Regarding the remaining two, we have

completed action to store plutonium 329, strontium 90, and we are in the process of completing work to store cesium 137. The recommendation concerning greater-than-class-C disposal has already been addressed by my colleague Ms. Gelles.

I would also like to highlight a few of the program's accomplishments very quickly. Most recently, the program was able to recover rapidly 470 abandoned sources from a bankrupt company in Pennsylvania. This was the largest and most complicated recovery undertaken to date. Additionally, DOE exceeded an aggressive congressional target of recovering 5,000 high-risk sources in just 18 months. Overall, the program has recovered more than 10,000 high-risk sources to date.

These and other activities were possible due to the Secretary of Energy's reallocation of \$3.5 million on an urgent basis. One notable recovery involved four large excess and unwanted strontium 90 sources containing more than 60,000 curies which were in the Houston area. DOE worked closely with the NRC, the Department of Homeland Security, and the Federal Bureau of Investigation, as well as the State of Texas, to remove these sources just prior to the Super Bowl.

DOE is working with DHS, NRC, and other agencies to develop further risk-based source recovery priorities. This resulted in the removal of 68 sources from 55 locations in the Boston and New York City areas in the month leading up to the national conventions. Most importantly, this included the program's first recovery of large cesium 137 sources from high schools.

As part of the Office of Global Radiological Threat Reduction's efforts to expand its scope and leverage its international threat reduction experience, we are working with the DHS radiological pilot effort. We recently participated in security enhancements of a number of New York City medical facilities having large radioactive sealed sources and provided DHS with recommendations.

Finally, the overall office is carrying out radiological threat reduction activities in approximately 40 countries and as part of the Secretary's newly established global radiological—global threat reduction initiative. This includes security enhancements to radioactive sources that are being used in hospitals and industrial facilities.

This concludes my remarks and I would be happy to take any questions.

[The prepared statement of Mr. McGinnis follows:]

PREPARED STATEMENT OF EDWARD G. MCGINNIS, DIRECTOR, OFFICE OF GLOBAL RADIOLOGICAL THREAT REDUCTION, NATIONAL NUCLEAR SECURITY ADMINISTRATION, DEPARTMENT OF ENERGY

Thank you, Mr. Chairman and members of the Committee, for giving me the opportunity to testify on the Department of Energy's (DOE) efforts to recover excess and unwanted radioactive sources within the United States. In April 2003, the Government Accountability Office (GAO) issued a report (GAO-03-483) on DOE's efforts to recover radioactive sources inside the United States. I am proud to report that the DOE radioactive source recovery program has effectively addressed, and in some instances exceeded, these recommendations by accelerating and expanding its recovery activities.

Before I describe our progress in responding to GAO's recommendations, I would like to say a few words about the radiological threat and why we are accelerating and expanding our efforts. The intent of terrorists to acquire radioactive materials for use in a radiological dispersal device is a real threat to the American public and

needs to be addressed. One of the many lessons learned from the attacks of September 11, 2001 is that some of the most common tools used in our daily lives, such as commercial airliners, can be used by terrorists in serious and, in some cases, devastating ways. Radioactive materials, in particular, are used routinely for a variety of medical, industrial and educational purposes. Cobalt-60 is used in hospital teletherapy units to treat cancer patients; cesium-137 is used in blood irradiators, food irradiators and educational research; the oil industry uses americium-241 for well-logging sources; and strontium-90 is used as remote power supplies. Should terrorists acquire and use these materials in a radiological dispersal device or so-called "dirty bomb" in public and commercial areas, the impact could be significant, depending on which isotope in what quantity were used and how effectively it was dispersed. Likely health and safety impacts would be modest, but economic costs are the real concern and could impose significant burdens on our society. Given the reality of this situation, Secretary Abraham, this Administration and Congress have taken important steps to increase radiological threat reduction efforts by giving them greater priority, increasing their funding and expanding DOE's authority in this area.

This Committee, and Congress as a whole, provided critical support to DOE's radiological threat reduction efforts both domestically and internationally. Key Congressional action that has helped make our efforts possible includes: the establishment of legal authority for DOE to collect particularly high-activity and high-risk radioactive sources (Greater-Than-Class-C) within the United States via the Low-Level Radioactive Waste Policy Amendments Act; emergency appropriations after the terrorists acts of "9/11" for the accelerated domestic recovery of radioactive sources; authorization and appropriations to carry out dirty bomb threat reduction efforts internationally; and most recently, emergency supplemental funding for DOE to carry out radiological threat reduction work in Iraq, which resulted in the successful removal of nearly 1,000 high-risk radioactive sources from that country.

I would also like to applaud the GAO for developing such a useful and constructive report and set of recommendations. The GAO staff did a very fair, balanced and competent review of the DOE's Off-Site Source Recovery Program. Their efforts helped us make significant improvements to the program.

GAO RECOMMENDATIONS AND DOE ACTIONS

The GAO report made five specific recommendations, and I would like to briefly go over them and how DOE has responded. First, I am pleased to report that DOE has carried out three of the recommendations, is very close to carrying out the fourth, and has initiated plans to address the remaining recommendation.

1. The GAO's first recommendation states that *unwanted Greater-Than-Class-C sealed sources could be used as weapons of terror. Therefore, the Secretary of Energy should determine whether the priority given to the Off-Site Source Recovery Project is commensurate with the threat posed by these sealed sources.*

In November 2003, the Secretary of Energy created the Nuclear and Radiological Threat Reduction Task Force under the National Nuclear Security Administration's (NNSA) Office of Defense Nuclear Nonproliferation. The existing Off-Site Source Recovery Program was transferred from the Office of Environmental Management to the NNSA and was made a key element of this Task Force. The Secretary then directed the Off-Site Recovery Program to realign its scope and mission to reflect the security threats posed by radioactive sources within the United States and to accelerate and expand its recovery efforts. In May 2004, the Secretary announced the creation of the Global Threat Reduction Initiative, and the Nuclear and Radiological Threat Reduction Task Force, including the source recovery program, was given even greater importance as a key element of this Initiative. To ensure long-term organizational and resource priority, the Secretary turned this Initiative into the Office of Global Threat Reduction, which is now managed by an Assistant Deputy Administrator within the NNSA. As part of these changes, the Off-Site Source Recovery Program became the cornerstone of what is now called the U.S. Radiological Threat Reduction program (USRTR), which is one of the two key pillars of the Office of Global Radiological Threat Reduction. The second pillar is the International Radiological Threat Reduction program, which has initiated radiological threat reduction efforts in 40 countries in Europe, Asia, Africa, and Central America. While the program name and headquarters organization have changed, the recovery operations and dedicated Off-Site Source Recovery Program personnel at the Los Alamos National Laboratory and other locations remain at the core of this highly successful program. These two pillars of the Global Threat Reduction Initiative were the focus of the successful Partners' Conference recently held in Vienna, Austria, and clearly

demonstrate the Secretary of Energy's commitment to ensure that this Initiative is given high priority.

2. The GAO's second recommendation was *that the Secretary should ensure that adequate resources are devoted to the project to cover the costs of recovering and storing these sealed sources as quickly as possible.*

The Secretary has taken a number of critical funding steps to ensure the Department's recovery efforts are fully covered. First and foremost, the Secretary nearly tripled the Off-Site Source Recovery Program's budget from \$1.96 million in fiscal year (FY) 2004 to a budget request in FY 2005 of \$5.6 million. In addition, the Secretary directed that an additional \$3.489 million be provided on a fast-track basis to the USRTR program during FY 2004 to respond to an unexpected Nuclear Regulatory Commission's (NRC) request to recover 470 sources from a bankrupt licensee in Pennsylvania, as well as a number of additional recovery efforts. The Secretary's proposed five-year budget for the recovery program also reflects important increases, including \$8.75 million in FY 2006, \$8.80 million in FY 2007, \$8.86 million in FY 2008, \$8.92 million in FY 2009, and \$9.53 million in FY 2010. With these funding levels, the Secretary of Energy has clearly demonstrated his commitment to provide the necessary funds and resources for this program to carry out its important mission.

3. The GAO also recommended *that the DOE ensure that unwanted Greater-than-Class-C sealed sources containing plutonium-239, strontium-90, and cesium-137 are properly secured to prevent their use in dirty bombs. In the case of sources containing plutonium-239, which can be used in nuclear weapons, we further recommend that the Secretary of Energy take immediate action to provide storage space for these sources at a secure DOE facility and establish milestones by which progress can be measured to ensure that the storage space is provided as soon as possible.*

Two of the three items in this recommendation have been carried out, and the third is in progress. In FY 2003, the USRTR program developed the necessary storage space at the Los Alamos National Laboratory and at the Nevada Test Site to secure sources containing plutonium-239. The program began receiving plutonium-239 sources in early FY 2004, and has recovered more than 260 plutonium-239 sources. These sources were manufactured in the 1950s, 1960s, and 1970s and loaned and/or leased to colleges and universities around the country by the Atomic Energy Commission. Due to the fact that they on loan, they remain the property of DOE. The USRTR program will continue to recover these sources until they have all been returned to the Department.

The program in early FY 2004 also developed the necessary storage space at the Los Alamos National Laboratory for strontium-90. In February 2004, the USRTR program recovered four large strontium-90 sources in the form of radio isotopic thermoelectric generators, which totaled over 60,000 curies. The USRTR worked closely with the NRC, the Department of Homeland Security (DHS), the Federal Bureau of Investigation, and the State of Texas to remove these sources from the Houston area just prior to the Super Bowl.

The program originally planned on developing cesium-137 storage during the second half of FY 2004, but these plans were interrupted by the need to respond to the NRC's emergency request concerning the bankrupt licensee in Pennsylvania with almost 470 sealed sources as well as some operating issues at one of our national laboratories. Consequently, there was a slight delay in developing cesium-137 storage. However, in August 2004, the USRTR successfully tested a capability to recover and recycle cesium-137 whereby storage is not required. This involved two large cesium-137 Gammator irradiator sources that were recovered from high schools in New York and New Jersey and recycled by private industry. The USRTR plans to continue to explore and utilize this recycling capability where possible and make storage a high priority for early FY 2005. The prospect of a continuing resolution based on an FY 2004 appropriation of only \$1.9 million may delay the programs' ability to address this issue. The USRTR program is able, however, to address cesium-137 through recycling and expects to carry out this GAO recommendation in early FY 2005 based on our FY 2005 funding request.

4. The GAO also recommended *that the Secretary of Energy initiate the process to develop a permanent disposal facility for Greater-Than-Class-C radioactive waste to carry out the requirements of Public Law 99-240. To help manage the process, the Secretary should develop a plan that would, at a minimum, assign responsibility for developing the facility; establish milestones by which progress can be measured; evaluate potential disposal options; estimate costs and schedules; and address legislative, regulatory, and licensing considerations.*

DOE is in the initial phase of a process to identify disposal options for Greater-Than-Class-C radioactive waste and ultimately select an option or options to be implemented. The first step will be to prepare an Environmental Impact Statement

under the National Environmental Policy Act to analyze the range of reasonable disposal alternatives. This will include an analysis of waste inventories and long-term disposition alternatives and resource requirements as well as an assessment of legislative, regulatory and licensing requirements, responsibilities and needs. The Department's Office of Environment, Safety and Health is in the process of laying out a path forward to satisfy DOE's National Environmental Policy Act responsibilities and select a disposal alternative or alternatives. DOE has had informal meetings with other Federal agencies to identify their interest in participating in the NEPA process with the DOE. The EIS will provide the basis for DOE to develop cost and schedule estimates and implementation plans for developing disposal capacity.

It is important to note that NNSA's sealed source recovery effort is not wholly dependent upon developing a new disposition path. There is a very capable commercial industry that can and has served as an effective pathway for disposition, interim storage and/or recycling for re-use. For example, the NNSA has determined that plutonium-239 sources addressed by the U.S. Radiological Threat Reduction Program are eligible for disposal at DOE's Waste Isolation Pilot Plant in New Mexico. Secondly, cesium-137 and cobalt-60 sources recovered earlier this year from a bankrupt commercial firm do not exceed the class C waste designation and have been disposed of at a commercial radioactive waste facility.

The use of commercial pathways makes sense for many reasons. They provide a potential and significant economy of cost because they use existing infrastructure, which eliminates the need for certain types of new storage facilities. They reduce the overall demand for new high-risk sources by maximizing the use of each source that is produced and introduced into the market. These actions are part of the Department's efforts to diversify its storage and disposition pathways, which ultimately result in savings to the U.S. taxpayer.

5. Finally, the GAO recommended *the development of a plan to ensure the continued recovery of Greater-Than-Class-C waste until a disposal facility is available.*

I am pleased to inform you that the Department does have a plan to recover Greater-Than-Class-C sources beyond the current projections for the availability of a disposal facility, which is reflected in the NNSA's five-year plan that extends to 2010. The USRTR program is working vigorously to plan and carry out these efforts.

REVISED SCOPE OF THE DEPARTMENT'S RADIOLOGICAL RECOVERY EFFORTS

The U.S. Radiological Threat Reduction Program is not only working with the NRC, but it is also beginning to work with the Department of Homeland Security and other agencies to determine which radioactive sources should receive highest priority for recovery. From a radiological security and threat reduction perspective, the levels and types of radioactive isotopes that are considered Greater-than-Class-C sources do not include the full range of radioactive sources that DOE's recovery program considers high-risk from the standpoint of their being used effectively in a radiological dispersal device. Based in part on DOE's significant experience in recovering and securing high-risk radioactive sources overseas, via its International Radiological Threat Reduction Program as well as on its re-examination of the scope of radioactive sources that should be addressed due to security concerns, DOE is in the process of expanding from three isotopes in mid-2003 to ten.

Already, 68 sources were removed from 55 locations in the Boston, Massachusetts, and New York City areas during the months leading up to the national conventions, including large cesium-137 Gammator irradiator sources from a high school in Long Island, New York, and another in Parsippany, New Jersey. The Global Threat Reduction Initiative sister programs also worked with DHS' Radiological Pilot Project office and local agencies in conducting security assessments of a number of New York City medical facilities that utilize large radioactive sealed sources.

In conclusion, since November 2003, when the USRTR program moved under the NNSA, it has exceeded the goal set by Congress of recovering 5,000 sources in eighteen months. It has recovered four large strontium-90 sources from the Houston area prior to the Super Bowl, responded to an emergency request from NRC to recover more than 470 sources from a bankrupt licensee in Pennsylvania, and passed the 10,000 source mark in terms of sources recovered since the program's inception. We believe this is an impressive record and the GAO audit recommendations helped NNSA to focus on what was necessary to achieve these successes.

I would be more than happy to answer any questions that you may have.

Thank you.

The CHAIRMAN. Normally we would proceed right to you, Ms. Nazzaro, but we are going to ask Senator Bingaman if he would

take a couple, ask a couple of questions, because he is on an extremely tight schedule. So you will be right after his questions.

Senator BINGAMAN.

Thank you very much, Mr. Chairman.

I did just really have one question that I wanted to ask Mr. McGinnis before I left. This is related to Senator Akaka's bill, S. 1045. It is his view that this legislation would help strengthen the source collection program in the DOE. Have you had a chance, has the administration had a chance, to review this bill and do you have a position on it that you could state for us today?

Mr. MCGINNIS. Well, I would defer to my colleague Ms. Gelles, as I am in the National Security Administration side of the house. We focus on the secure removal of the sources. I can tell you that our goals are to recover and securely store greater-than-class-C sources that are declared excess as rapidly as possible. I think we all have that common goal.

So from the standpoint of reducing the threat from dirty bombs, we are moving forward in that area to secure and store on an interim basis sources, of which I have said we have recovered about 10,000 already.

Senator BINGAMAN. Ms. Gelles, did you have any wisdom you could give us about this particular bill Senator Akaka has proposed.

Ms. GELLES. Senator, I am sorry, I am unable at this time to provide the Department's position on the draft legislation, but we will be happy to provide that for the record.

[The information referred to follows:]

The Department understands the importance of the issues raised in S. 1045. The Department believes that the designation of the Office of Environmental Management to deal with the disposal of greater-than-Class-C (GTCC) low-level radioactive waste for which DOE is responsible, including preparation of an environmental impact statement that will evaluate the factors associated with various disposal options, addresses the issues and concerns raised in S. 1045. The Department affirms that the decision-making process on disposal options for GTCC low-level radioactive waste will not impede on-going and future efforts by the National Nuclear Security Administration to recover and store radioactive sealed sources that are declared excess and pose a security threat.

Senator BINGAMAN. That would be a big help.

That is all I had, Mr. Chairman. Thank you again for having the hearing.

The CHAIRMAN. Thank you very much.

Let me ask any of you that would like to volunteer. Could you for us and for the record and for the press that is here just tell us what we are talking about when we talk about low-level radioactive wastes? Anything radioactive is ominous as people look at it. I do not mean that for real, but could you tell us what it is? What makes up this universe called "low-level radioactive waste"?

Yes, sir, Alan, Mr. Pasternak, do you want to try it?

Mr. PASTERNAK. Yes, let me take a stab at it. In my written testimony there is the statutory definition of "low-level radioactive waste." It is defined as waste that is not high-level waste, waste that is not transuranic waste. To that extent it is defined by what it is not. But to be more specific, the Nuclear Regulatory Commission has very specific regulations that describe class A, class B, and

class C wastes, and than anything above that is greater-than-class-C.

So you look to the statute and you look to the regulations to find out what it is. It is generated by——

The CHAIRMAN. Where does it come from?

Mr. PASTERNAK. It comes from nuclear power plants, it comes from universities, hospitals, industries, including the pharmaceutical and biotech industries, which use radioactive materials in their research. It is used even I think in the construction industry, sealed sources. The use of radioactive materials is ubiquitous.

The CHAIRMAN. Now, before we go on let me just ask: Normally when we think of radioactive waste we think about nuclear power plants and we think about that kind of thing, or nuclear weapons. Essentially, the real concern we have about the expiration date is that the medical facilities of our Nation that produce huge quantities of this waste, if they do not have a place to send this they are going to have a problem of what they do with it and they will have to keep it on-site, which would not be something that would be a very good situation for the United States.

How much, generally speaking, of this waste comes from treatment of people medically and for their health, for health reasons? Does anybody have an idea?

Mr. PASTERNAK. I do not think much of it comes from treatment. Certainly some of it does. It is from the manufacture of the radiopharmaceuticals, it is from the research. The shortage of disposal capacity has already had some effect in research. I know of one major institution in California that no longer does large animal research because they cannot get rid of the carcasses.

But in terms of quantities, whether you measure by radioactivity or you measure by volume, the major producers are the nuclear power plants and industries. It is a little bit hard to separate out medical and university because if it is from a university that has a medical department it is categorized as academic, not medical. So it is a little hard.

The CHAIRMAN. OK, let us go to you, Ms. Nazzaro. Would you please proceed.

STATEMENT OF ROBIN M. NAZZARO, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Ms. NAZZARO. Thank you, Mr. Chairman and Senator Craig.

I do have some numbers for you, Senator Domenici, on the volume of wastes. If you put academic and medical together it is .5 percent. So as was stated by Mr. Pasternak, 87, almost 88, percent comes from the utilities and almost 10 percent comes from industry.

The CHAIRMAN. OK. Thank you very much. I should have asked you.

Ms. NAZZARO. In the sake of time, you asked us to look at six issues, so I will forego any background and just give you our findings on the six issues from the two reports that cover disposal of class A, B, and C waste as well as the greater-than-class-C waste. We identified several changes that might affect disposal availability. Most notably, one facility plans to close its doors to most

States by mid-2008, but new options might counter the shortfall. We also identified changes in Federal agency monitoring of waste management, including the fact that DOE no longer provides technical assistance to the States and its annual reporting to the Congress on waste disposal was terminated in 2003.

Disposal volumes grew to about 12 million cubic feet in 2003, an increase of 200 percent over 1999. Class A wastes accounted for 99 percent of that volume, which came primarily from DOE's cleanup program. The Envirocare facility disposed of almost all of the class A wastes, while Barnwell disposed of almost all of the B and C wastes. We relied on data from the disposal operators, as Ms. Gelles identified, because the data base that DOE maintained did not include the DOE waste shipped for commercial disposal and had other deficiencies. The timing and volume of wastes needing disposal in the future, however, is uncertain and will depend largely on waste disposal decisions by DOE and the Nuclear utility companies.

However, there appears to be enough disposal availability, at least to mid-2008. Disposal availability for class A waste is not a problem because Envirocare has enough capacity for more than 20 years. Capacity at Richland and Barnwell is more than sufficient to serve the needs of the 14 States they serve. However, after mid-2008 South Carolina plans to terminate its access to Barnwell for the remaining 36 States that now rely on this facility for disposal of their B and C wastes.

Nevertheless, any disposal shortfall is unlikely to pose an immediate problem because users of radioactive materials can continue to minimize waste generation, process them into safer forms, and store the waste. While these approaches can be costly, we did not identify any other widespread effects.

The act has not resulted in the development of additional regional disposal capacity. Several reasons account for this, including decreased commercial waste generation, adequate disposal capacity, the rising cost of developing disposal facilities, and public and political resistance in States designated to host these facilities.

Regarding the greater-than-class-C waste, DOE's lack of progress in providing a permanent disposal facility was the focus of our message. As an interim step, DOE is collecting and storing this material, as Mr. McGinnis mentioned. However, this effort has experienced a number of problems, including inadequate capacity to store certain isotopes.

To better manage waste disposal, as noted by Ms. Gelles, we recommended that the Secretary of Energy halt dissemination of the information in their national data base. We do not question the usefulness of the data base. However, we would like to see them strengthen internal controls over the data reliability and validity. We also suggested that the Congress may wish to consider directing NRC to report to it if waste disposal and storage conditions should change enough to warrant consideration of new legislation. Regarding DOE's effort to secure the greater-than-class-C materials, we made a number of recommendations to better address national security risks posed by these materials. To date over 10,000 sources have been recovered. DOE is also planning to conduct the

initial environmental analysis required to develop the permanent disposal facility.

Mr. Chairman, this concludes my statement and I would be happy to respond to any questions you or Senator Craig may have. [The prepared statement of Ms. Nazzaro follows:]

PREPARED STATEMENT OF ROBIN M. NAZZARO, DIRECTOR NATURAL RESOURCES AND ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

LOW-LEVEL RADIOACTIVE WASTE—FUTURE WASTE VOLUMES AND DISPOSAL OPTIONS ARE UNCERTAIN

WHY GAO DID THIS STUDY

Low-level radioactive waste (LLRW) management concerns persist despite the LLRW Policy Act of 1980, as amended, which made states responsible for providing for disposal of class A, B, and C LLRW and made the Department of Energy (DOE) responsible for the disposal of greater-than-class-C LLRW. This testimony is based on GAO's June 2004 report, which examined the adequacy of disposal availability for class A, B, and C wastes, and GAO's April 2003 report, which assessed recovery efforts involving greater-than-class-C waste. This testimony examines (1) changes in LLRW disposal availability since 1999, (2) recent LLRW disposal volumes and potential future volumes, (3) any current or anticipated shortfalls in disposal availability, (4) the potential effects of any such shortfalls, (5) the effectiveness of the Act in developing regional disposal options for class A, B, and C wastes, and (6) the status of DOE's effort to dispose of greater-than-class-C waste.

WHAT WE RECOMMEND

The reports recommended that DOE improve its database and the management of greater-than-class-C wastes. DOE is implementing most of these recommendations. In addition, GAO suggested that the Congress may wish to consider directing the Nuclear Regulatory Commission to report if LLRW conditions change enough to warrant legislative intervention.

WHAT GAO FOUND

GAO's June 2004 report identified several changes since 1999 that have affected, or might affect, LLRW disposal availability and federal oversight. Specifically, one disposal facility plans to close its doors to most states, but new options are evolving that might offset this shortfall.

According to data from the three commercial disposal facility operators, annual LLRW disposal volumes have increased in recent years. In conducting this assessment, GAO relied on data from the operators because DOE's national LLRW database was unreliable. The timing and volume of future waste needing disposal are uncertain because of the difficulty in forecasting disposal shipments from DOE and nuclear utilities.

At current LLRW disposal volumes, disposal availability for class A waste is not a problem in the short or longer term. Disposal availability appears adequate until mid-2008 for class B and C wastes when, if disposal conditions do not change, most states will not have a place to dispose of these wastes.

Nevertheless, users of radioactive materials can continue to minimize waste generation, process waste into safer forms, and store waste if there are no disposal options for class B and C wastes after 2008. While these approaches are costly, GAO did not identify other immediate widespread effects.

The Act has not resulted in the development of additional regional disposal capacity for class A, B, and C wastes. Factors limiting further development include less waste, adequate disposal capacity, rising development costs, and public and political resistance in states designated to host these facilities.

DOE has not yet provided a facility for the permanent disposal of greater-than-class-C waste, but it is collecting this material to address security concerns in the interim.

Mr. Chairman and Members of the Committee, we are pleased to be here today to discuss our past and ongoing work on the management of low-level radioactive waste (LLRW). LLRW is an inevitable byproduct of nuclear power generation and of government, industrial, academic, and medical uses of radioisotopes. LLRW includes items such as rags, paper, liquid, glass, metal components, resins, filters, and protective clothing that have been exposed to radioactivity or contaminated with ra-

radioactive material. States' management of LLRW continues to be a concern despite two-decade-old federal legislation addressing the need for disposal. Under the LLRW Policy Act of 1980, as amended (the Act), each state is responsible for providing for disposal of LLRW generated within the state, either by itself or in cooperation with other states, with the exception of waste produced by the Department of Energy (DOE) and the nuclear propulsion component of the Department of Navy. The aim of the Act was to provide for more LLRW disposal capacity on a regional basis and to more equitably distribute responsibility for the management of LLRW among the states. As an incentive for states to manage waste on a regional basis, the Congress consented to the formation of interstate agreements, known as compacts, and granted compact member states the authority to exclude LLRW from other compacts or unaffiliated states.¹

The Nuclear Regulatory Commission (NRC) is responsible for licensing LLRW disposal sites and has divided the wastes covered by the Act into categories of increasing levels of hazard exposure, beginning with class A, followed by class B and C.² There are currently three commercial LLRW disposal facilities where these wastes can be disposed of—the Chem-Nuclear Systems facility in Barnwell County, South Carolina, the Envirocare facility in Tooele County, Utah, and the US Ecology facility in Benton County, Washington. DOE is responsible for disposing of a fourth category of LLRW, known as greater-than-class-C waste. This latter waste is not generally acceptable for disposal near the surface like the other three waste classes.

Our testimony today is based on two reports: (1) our June 2004 report in which we examined the adequacy of LLRW disposal availability for class A, B, and C wastes;³ this report updated a 1999 report, in which we found that states were not developing new disposal facilities and that within 10 years the only facility available to waste generators in most states for class B and C wastes could be full,⁴ and (2) an April 2003 report addressing the status of DOE's program to dispose of greater-than-class-C waste.⁵ As you requested, our testimony examines the findings and conclusions of these reports and offers a perspective on the effectiveness of the Act. Specifically, our testimony examines (1) changes in LLRW disposal since 1999 that we identified in our 2004 report, (2) recent LLRW disposal volumes and potential future volumes, (3) any current or anticipated shortfalls in disposal availability, (4) the potential effects of any such shortfalls, (5) the effectiveness of the Act in developing regional disposal options for class A, B, and C wastes, and (6) the status of DOE's effort to dispose of greater-than-class-C material.

In summary:

In June 2004, we identified several changes since 1999 that have affected, or might affect, LLRW disposal availability and federal oversight. These changes include South Carolina's decision to close the Barnwell facility to non-compact states by mid-2008, issuance of a license for the Envirocare facility to accept class B and C wastes pending approval by the Utah legislature and governor, the potential licensing of a new facility in Texas, and the state of Nebraska's litigation settlement with the Central Interstate Compact for reneging on its compact obligations to build a new facility. We also identified changes in federal agency monitoring of LLRW management. DOE no longer has appropriated funds to provide technical assistance to the states, and the annual requirement that DOE report to the Congress on LLRW disposal was terminated effective 2003. Furthermore, in the late 1990s, NRC decreased its involvement in LLRW because no disposal sites were being developed.

Annual LLRW disposal volumes have increased in recent years; however, the timing and level of future volumes needing disposal are uncertain. According to data provided by the three commercial LLRW disposal facility operators, disposal volumes grew to about 12 million cubic feet in 2003, an increase of 200 percent over 1999. Class A waste accounted for 99 percent of the disposal volume—DOE's clean-up program generated about 78 percent of the total class A waste. The Envirocare facility disposed of 99 percent of the nation's class A waste disposed of in commercial facilities in 2003 while the Barnwell facility disposed of 99 percent of the class

¹Generators of LLRW located in compact or unaffiliated states that do not have their own disposal facility can contract with a disposal facility in another compact if this compact allows them to do so.

²Radioactive waste is classified by type of radionuclide (e.g., americium-241) and concentration of radioactivity (often measured in curies per gram).

³GAO, *Low-Level Radioactive Waste: Disposal Availability Adequate in the Short Term, but Oversight Needed to Identify Any Future Shortfalls*. GAO-04-604 (Washington, D.C.: June 9, 2004).

⁴GAO, *Low-Level Radioactive Wastes: States Are Not Developing Disposal Facilities*, GAO/RCE-99-238 (Washington, D.C.: Sept 17, 1999).

⁵GAO, *Nuclear Nonproliferation: DOE Action Needed to Ensure Continued Recovery of Unwanted Sealed Radioactive Sources*. GAO-03-483 (Washington, D.C. April 15, 2003).

B and C wastes that went to commercial disposal. We relied on data from these operators because the national LLRW database maintained by DOE lacked data on the department's waste shipped for commercial disposal and had other deficiencies. Even if the data problems are resolved, uncertainties will remain regarding the timing and volume of LLRW needing disposal in the future, which will largely depend on the disposal decisions made by DOE and nuclear utility companies.

There appears to be enough disposal availability to serve the nation's needs at least until mid-2008, when generators in many states might have a shortfall in disposal availability for their class B and C wastes. Disposal availability for class A waste is not a problem in the short or longer term, provided that the Envirocare facility continues in operation. According to Envirocare, the disposal facility can take 20 years or more of such waste under its current license. Capacity at the Barnwell and Richland facilities, which are licensed to accept all three classes of LLRW, is more than sufficient to serve the needs of the 14 states within the compacts served by these facilities. However, South Carolina has enacted legislation to terminate non-compact states' access to this facility after mid-2008. This action will affect the 36 states that currently rely on Barnwell to dispose of their class B and C wastes but are not members of the Atlantic compact.

Users of radioactive materials can continue to minimize waste generation, process waste into safer forms, and store waste if there are no disposal options for class B and C wastes after 2008. These approaches, however, can be costly, with a higher financial burden on some licensees than others. Notwithstanding these business costs, we did not identify other effects of any shortfalls in disposal availability that might have wider implications.

The Act has not resulted in the development of additional regional disposal capacity for class A, B and C wastes. As we previously reported, several reasons account for this lack of progress: decreased waste generation, adequate disposal capacity, the rising cost of developing disposal facilities, and public and political resistance in states designated to host these facilities.

We reported in April 2003 on DOE's lack of progress in providing a permanent disposal facility for greater-than-class-C waste. DOE created the Off-Site Source Recovery Project as an interim step toward meeting its obligation under the Act. The project provides secure storage for material that could be particularly attractive for use in a radiological dispersion device, or "dirty bomb." As we reported, the project has experienced a number of problems. For example, we noted that DOE had inadequate capacity to store certain isotopes, particularly sources containing plutonium-239 that in sufficient quantity could be used to fabricate a crude nuclear weapon. Such sources, in some cases, were not being securely stored and most holders of the material expressed their desire to dispose of it as quickly as possible.

The two reports discussed in this testimony contained a number of recommendations. In our June 2004 report on disposal availability, we recommended that the Secretary of Energy halt the dissemination of information in its national LLRW database as long as the database has shortcomings in its usefulness and reliability. DOE decided to leave the database online but has added a notice to users of the database regarding inaccuracies and is taking steps to identify and update erroneous data. Our report also suggested that the Congress might wish to consider directing NRC to report to it if LLRW disposal and storage conditions should change enough to warrant consideration of new legislation to improve the reliability and cost-effectiveness of disposal availability. Our April 2003 report on DOE's Off-Site Source Recovery Project recommended that DOE (1) determine whether the priority given to the recovery project was commensurate with the threat posed by greater-than-class-C sealed sources, (2) provide, as soon as possible, storage space for sealed sources containing the isotopes plutonium-239, strontium-90, and cesium 137 with the appropriate level of security, and (3) initiate the process to develop a permanent disposal facility for greater-than-class-C radioactive waste, develop a plan to help manage this process, and develop a plan to ensure the continued recovery and storage of greater-than-class-C sealed sources until such a disposal facility is available. As a result of our recommendation, DOE moved the program and realigned management responsibility for the project out of the Office of Environmental Management and into the National Nuclear Security Administration (NNSA) in order to better address the national security risks posed by these materials.⁶ To date, over 10,000 sources have been recovered, but more still need to be collected. In addition, DOE has added more storage space and is again recovering sources containing plutonium-

⁶NNSA has combined the recovery project with other nonproliferation activities under the U.S. Radiological Threat Reduction Program.

239. DOE is also planning to conduct the initial environmental analysis required to develop a permanent disposal facility for this waste.

BACKGROUND

The disposal of LLRW is the end of the radioactive material life cycle that spans production, use, processing, interim storage, and disposal. In general, the life cycle starts with the procurement of the radioactive isotopes that have medical, industrial, agricultural, and research applications. The isotopes come in either sealed or unsealed sources. While a metal container shields a sealed source, unsealed sources remain accessible in a glass vial or other type of container. Common uses of this radioactive material are in radiotherapy, radiography, smoke detectors, the irradiation and sterilization of food and materials, gauging, and illumination of emergency exit signs. In the course of working with these materials, other material, such as protective clothing and gloves, pipes, filters, and concrete that come in contact with them will become contaminated. The nuclear utility industry generates the bulk of this LLRW through the normal operation and maintenance of nuclear power plants, and through the decommissioning of these plants. Some sealed sources can be recycled for other uses that require less radioactivity. Once these materials have served their purpose, they become LLRW. Specialized companies or those licensed to use these materials can reduce the volume and sometimes the radioactivity level of the waste through processing before it is either put into a licensed interim storage or a disposal facility. After a period of storage, some LLRW can decay to the point that it is safe for disposal in regulated landfill sites. During the life cycle, there will also be some loss of radioactive materials to abandonment, misplacement and theft. Figure 1 diagrams the life-cycle process for radioactive materials.*

In the 1960s, the Atomic Energy Commission began to encourage the development of commercial LLRW disposal facilities to accommodate the increased volume of commercial waste that was being generated. Six such disposal facilities were licensed, two of which, the facility in Washington State, licensed in 1965, and in South Carolina, licensed in 1971, remain open today.⁷ Each of these facilities is located within the boundaries of or adjacent to a much larger site owned by DOE. The third facility in Utah is about 80 miles west of Salt Lake City. Utah initially licensed the Envirocare facility in 1988 to accept naturally occurring radioactive waste. In 1991, Utah amended the license to permit the disposal of some LLRW, and the Northwest Compact agreed to allow Envirocare to accept these wastes from non-compact states. By 2001, the facility was allowed to accept all types of class A waste. Because of its higher radioactive content, greater-than-class-C waste cannot be disposed of in these commercial disposal facilities. Instead, the Act requires DOE to provide a facility for disposing of all greater-than-class-C radioactive waste.

Currently, 10 compacts include 43 states: the Appalachian, Atlantic, Central, Central Midwest, Northwest, Midwest, Rocky Mountain, Southeast, Southwestern, and Texas compacts. Seven states, as well as the District of Columbia and Puerto Rico, are unaffiliated. Figure 2 shows the state LLRW compacts and unaffiliated states.

SINCE 1999, LLRW DISPOSAL AVAILABILITY AND FEDERAL OVERSIGHT HAVE CHANGED

In June 2004, we identified a number of important changes that had occurred since our 1999 report; these changes have affected, or might affect, future disposal availability for these wastes and federal oversight of states' LLRW management. Changes that might have implications for long-term disposal availability include the following:

- In 2001, South Carolina enacted legislation restricting the use of the Barnwell disposal facility to generators in the three-member Atlantic compact after mid-2008. In the past, the state legislature has changed its position on restricting access to this facility, both closing and reopening the facility to non-compact member states over the years.
- In 2001, Envirocare received a license from the state regulatory authority to accept class B and C wastes pending approval by the Utah legislature and governor. Currently, the state has imposed a moratorium on approving the use of this license until February 2005, after a review of the recommendations of a hazardous waste regulation and policy task force. The task force is expected to issue its final report by November 2004. Granting approval for Envirocare to use its class B and C wastes license could help to alleviate a shortfall in disposal availability for class B and C wastes.

*All diagrams are available in committee files.

⁷ Under the auspices of the Atomic Energy Commission, four other commercial disposal facilities were licensed in the 1960s, including facilities in Illinois, Kentucky, Nevada, and New York.

- In 2003, Texas enacted legislation designating a geographic area in the state as acceptable for a new LLRW disposal facility, and the state regulator developed a license application process for this facility. In August 2004, a private company submitted a license application to the Texas Commission on Environmental Quality for approval to construct and operate a disposal facility 30 miles west of Andrews, Texas. Current projections by the state of Texas suggest that the earliest a facility could be licensed is 2007. Non-compact states' access to this facility has not been determined. If the Texas facility were allowed to accept waste nationally, it would mitigate a potential shortfall in disposal availability for class B and C wastes.
- In 2004, the Court of Appeals for the 8th Circuit affirmed a federal district court decision that Nebraska, as a designated host state, is liable for \$151 million in damages for reneging on its obligations to the Central Compact to build a disposal facility. Since the issuance of our June 2004 report, the Central Interstate Compact voted to accept a settlement with Nebraska for \$141 million plus interest. Under the settlement, if Nebraska and other compact members negotiate access to the proposed disposal facility in Texas, the amount Nebraska would have to pay would be reduced to \$130 million plus interest.

The remaining changes affect federal agency guidance and oversight of LLRW management by the states. These include the following:

- In 2001, DOE significantly diminished its involvement in guiding and overseeing LLRW management by the states. DOE's reporting requirement on LLRW management, as originally required by the Act, terminated effective May 2000. In addition, DOE's technical assistance activities under the Act have essentially ended after a period of shifting emphasis and decline.
- Since the late 1990s, NRC has decreased its direct involvement in states' LLRW management because no new disposal sites were being developed and more states have taken on the responsibility for the regulation of radioactive material from NRC.

ANNUAL LLRW DISPOSAL VOLUMES HAVE INCREASED, BUT FUTURE VOLUMES ARE UNCERTAIN

Annual LLRW disposal volumes have increased significantly in recent years, primarily the result of cleaning up DOE sites and decommissioning nuclear power plants. To obtain disposal volume information, we relied on data from the three commercial disposal facility operators because the Manifest Information Management System (MIMS)—the online commercial disposal LLRW database maintained by DOE—is not as up-to-date as the facilities' data and has other deficiencies. Future disposal volumes remain uncertain and will depend largely on waste disposal decisions by DOE and nuclear utility companies.

LLRW Disposal Volumes Have Increased Significantly Since 1999

Since the beginning of 1999, disposal volumes have steadily increased to over 12 million cubic feet in 2003, an increase of over 200 percent. Class A waste accounted for 99 percent of all waste disposed of at the three commercial disposal facilities. The Envirocare facility received 99 percent of this class A waste, and about 78 percent of this class A waste came from DOE clean up sites. According to Envirocare, DOE has increased its shipment of waste to the facility from about 36,000 cubic feet in 1994 (6.6 percent of the class A waste disposed) to almost 9.3 million cubic feet in 2003 (77.8 percent of the class A waste disposed). In contrast, disposal volumes of commercial class B waste declined 47 percent, from about 23,500 cubic feet in 1999, to about 12,400 cubic feet by 2003. Commercial class C waste disposal volumes were more volatile, changing as much as 107 percent in a single year. The total annual disposal volume of class C waste alternately rose and fell between 1999 and 2003, with the annual total reaching over 20,000 cubic feet in 1999, falling as low as about 11,000 cubic feet in 2002, then rising to over 23,000 cubic feet in 2003. Of the total class B and C wastes disposed of in commercial facilities in 2003, 99 percent went to Barnwell.

Concerns about the Completeness and Reliability of National LLRW Database

Because of concerns about data completeness and reliability, we did not use the database that DOE maintains and operates for the LLRW community and public when we determined recent disposal volumes. Nor did we use other information in this database to analyze sources of LLRW by state, compact, and generator type because of shortcomings in its usefulness and reliability. Instead, we relied on data supplied to us from the three commercial disposal operators for our analysis because

these data include DOE waste volumes sent for commercial disposal, are more up to date and are the primary source data input into MIMS.

With respect to data completeness, even though DOE ships large quantities of LLRW to a commercial disposal facility, this information is not captured in MIMS. Also, other types of information, such as the storage of waste and volume of waste reduction, are not collected in this database. The consensus among the compact and unaffiliated state officials we surveyed was that they could more effectively regulate and monitor LLRW in their compacts and states if MIMS offered more comprehensive and reliable data. Despite these shortcomings, these officials have sometimes used MIMS data as a convenient source of information for public, media, and stakeholder inquiries, as a means of monitoring LLRW within their compact or region, and as an external check on the LLRW interstate shipment data reported to compact and state regulators by the disposal operators.

We also identified shortcomings in the reliability of the MIMS database. We found inconsistencies between what the disposal facility operators claimed had been disposed of at their facilities and what was recorded in this database. For example, excluding waste generated by DOE, the volumes of LLRW reported to us by Envirocare for 1999 to 2003 totaled 10.4 million cubic feet, compared to the 15.7 million cubic feet reported in MIMS. There were also problems with other kinds of data in MIMS. States and compacts have also identified discrepancies that undermine the data's usefulness, particularly regarding the state-specific information on the origins of waste. For example, Tennessee, which is the base of operations for companies that transport and process the waste from generators in other states prior to disposal, reports that it is erroneously recorded in MIMS as the state of origin of this waste.

The data DOE puts into MIMS comes from the three commercial LLRW disposal facility operators in electronic format. DOE pays each operator varying amounts of money to extract data from the records accompanying shipments of LLRW that provide information on the volume, radioactivity level, source, and other information about the waste. These records are called manifests, and NRC requires their use to track shipment of radioactive materials. The disposal operator then transmits some of this information to DOE for entry into MIMS. Each disposal facility operator is responsible for ensuring the validity of these data, but DOE's contracts with these operators leave to them what steps, if any, should be taken to validate the data. DOE takes no responsibility for verifying the accuracy of the data supplied by the disposal facility operators. Furthermore, while DOE takes some steps to ensure that it accurately uploads operator-supplied data into MIMS, it does not perform other systematic quality checks on the data, such as "reasonableness" checks, cross tabulations, or exceptions reports. As a result, the lack of consistent and comprehensive internal controls, such as controls over information processing, undermine our confidence in the data output in MIMS for several types of information, including sources of waste coming from states, compacts, and generator types.

We recommended in our June 2004 report that the Secretary of Energy halt dissemination of information in DOE's national LLRW database as long as the database has shortcomings in its usefulness and reliability. DOE subsequently decided to leave the database online but has added a notice to users of the database regarding inaccuracies and is taking steps to identify and update erroneous data.

Uncertainties Surround Projecting Future LLRW Disposal Volumes

Notwithstanding problems obtaining comprehensive and reliable LLRW disposal data, uncertainties remain concerning the timing and volume of LLRW needing disposal in the future, which largely will depend on the disposal decisions made by nuclear utility companies and DOE, as well as on possible changes in regulatory standards for what constitutes LLRW. For example, officials at DOE told us that projections for sites now being cleaned up have not proven very accurate, and have tended to significantly overestimate waste volumes that would require disposal as LLRW. They cited several reasons for this difficulty: records from "legacy" sites—former nuclear weapons production sites that DOE is cleaning up—have not proven to be reliable; the decay rate of known buried radioactive wastes have often been higher than expected so wastes that were expected to need disposal as LLRW can instead be legally classified as radioactive waste mixed with nonradioactive but hazardous wastes and sent to less expensive disposal facilities; contractors have become more innovative and skilled in sorting and segregating hazardous and mixed wastes from LLRW so that a higher percentage of wastes can be disposed of as hazardous or mixed wastes rather than LLRW; and some debris and material from site cleanup projected to be LLRW has no appreciable radioactivity when generated and can therefore be disposed in sanitary landfills or other non-LLRW disposal facilities. There are some indications that the volume of DOE cleanup waste likely to be sent

to commercial LLRW disposal facilities could currently be at or near a peak and could soon rapidly decline as cleanup at some DOE sites winds down and as cleanup activity shifts to other DOE sites that have considerable on-site disposal capacity. As a result, DOE officials expect the use of commercial LLRW disposal facilities will start declining after 2006 and will stay comparatively low until another anticipated spike in 2014. DOE officials stressed, however, that “high confidence numbers” are not yet available because the department is still in the process of reorganizing and developing new baselines for its accelerated cleanup projects, and it does not have a management system in place to develop corresponding waste projections.

Potential changes to the threshold at which waste is classified as LLRW are currently under consideration and could affect the amount of waste needing disposal in the future. The National Research Council and the Environmental Protection Agency (EPA) are separately studying this issue and considering possible changes that might affect the future management of LLRW. The National Research Council is studying the issue because members of its Board on Radioactive Waste Management are concerned that the statutes and regulations governing LLRW management may be overly restrictive in some cases, leading to excessive costs and other burdens on the waste generator and, in other cases, may lead to an exaggeration of the potential risks posed by these materials. EPA is examining its existing waste regulations and has begun soliciting public comment as it considers new rulemaking in this area. Specifically, EPA is exploring an option with NRC to establish a regulatory framework that allows some of the lower activity radioactive waste to be disposed of at non-LLRW disposal facilities. Finally, and in a similar vein, government and industry LLRW stakeholders have discussed harmonizing U.S. standards with the prevailing international standards for LLRW under consideration by the International Atomic Energy Agency. Such a change could prompt U.S. regulators to consider raising the threshold at which the radioactivity of waste would trigger regulation as LLRW and would allow for lower activity LLRW to be disposed of under other regulatory regimes.

LLRW DISPOSAL AVAILABILITY APPEARS ADEQUATE UNTIL MID-2008

Disposal availability appears adequate to serve the nation’s needs at least until mid-2008, when many states might lose disposal access for their class B and C wastes. Disposal availability for class A waste is not a problem in the short or longer term. According to Envirocare representatives, their disposal site, which accepted over 99 percent of the nation’s commercially disposed of class A waste in 2003, has enough capacity to accept this waste at the current volume levels for more than 20 years. The Richland facility has about 21 million cubic feet of capacity remaining for all classes of waste, which is more than enough to accommodate the LLRW coming from the 11 states in the Northwest and Rocky Mountain compacts until the expected closure of this facility in 2056. The Barnwell disposal facility has about 2.7 million cubic feet of remaining capacity, most of which has been set aside for waste from generators in the Atlantic Compact until 2050. Barnwell also appears to have enough disposal capacity to continue accepting class B and C wastes from other states until mid-2008, when it is scheduled to close to all but the three Atlantic compact states. According to the Director of Disposal Services at Chem-Nuclear Systems, the operator of the Barnwell facility, there should be enough space at the facility to accommodate the typical 20,000 to 25,000 cubic feet of class B and C wastes accepted at this facility in recent years. This representative told us that many generators have already contracted to dispose of their B and C wastes in the short-term, and any generator outside of the Atlantic Compact anticipating a need to dispose of these wastes could still contract for the necessary space until mid-2008.

A number of factors support the likelihood that disposal space for class B and C wastes will be available at Barnwell until mid-2008, if disposal volumes do not exceed anticipated levels. Based on current space commitments at this disposal facility under the conditions of the volume caps set by the South Carolina legislature, there remains between 24,500 to 44,500 cubic feet of uncommitted space until 2008. The amount of space available depends on whether Atlantic Compact generators use all of their set-aside space through 2008. In addition, utilities are likely to take more aggressive efforts to ensure sufficient space for class B and C wastes at Barnwell. Industry officials said utilities might consider several initiatives and conditions that could alleviate the diminishing disposal availability for class B and C wastes. For example, utilities could send class A waste to Envirocare rather than Barnwell to save the remaining space at Barnwell for class B and C wastes. In addition, utilities might increase waste reduction efforts and storage.

After 2008, disposal availability for the class B and C wastes generated in the 36 states outside the Northwest, Rocky Mountain, and Atlantic compacts is more un-

certain. Disposal availability for these states will depend on a number of possibilities, including extending access to Barnwell beyond mid-2008 or creating new disposal options for these classes of waste. The Barnwell facility has opened and closed to non-compact member states before and could again. Given the difficulties of attracting class A waste to Barnwell because of the high disposal fees, and the fairly consistent level of class B and C wastes shipped to this site each year, the facility might not even reach its volume cap of 35,000 cubic feet per year after 2008. In addition, the set-aside of 2.2 million cubic feet for Atlantic Compact generators through 2050 may be negotiated downward, freeing up additional space at this disposal facility. It is also possible that new disposal options will become available in the future that could alleviate any disposal crisis for class B and C wastes. Finally, regardless of the outcome, representatives of the Nuclear Energy Institute, the policy organization of the nuclear energy industry, said that utilities, the greatest generator of class B and C wastes, can store these wastes on site if they have no disposal option.

ANY LLRW DISPOSAL SHORTFALL AFTER MID-2008
UNLIKELY TO POSE IMMEDIATE PROBLEM

If after mid-2008, there are no new disposal options for class B and C wastes, licensed users of radioactive materials can continue to minimize waste generation, process waste into safer forms, and store waste pending the development of additional disposal options. These approaches, however, can be costly, with a higher financial burden on some licensees than others. Notwithstanding these business costs, we did not identify other effects of any shortfalls in disposal availability that might have wider implications.

LLRW Minimization and Storage Can Lessen Effects of Any Disposal Shortfall

The licensed users of radioactive materials that must eventually dispose of their LLRW have employed a variety of techniques to both minimize and process this waste to reduce its volume before storage and eventual disposal. These techniques include substituting nonradioactive materials for radioactive materials, separating radioactive materials from nonradioactive materials, recycling, compaction, dilution, and incineration. For example, it is reported that most large research institutions make concerted efforts to find suitable and appropriate alternatives to the use of radioactive materials. One university official told us that such efforts have reduced LLRW generation at his institution by 30 percent in the last 5 years. The Electric Power Research Institute is encouraging nuclear utilities to use vendor volume reduction programs for resins, the single largest component of class B and C wastes, to reduce volume. Some licensees have used processors to super-compact class A waste to achieve up to a 5,000 percent reduction in volume, or to reduce this waste to ash through incineration, albeit increasing the concentration of radioisotopes.

In addition to minimizing LLRW, licensees can decide to store this waste when no disposal option is available to them. In order to obtain a license to possess radioactive materials, entities must demonstrate the technical capability to safely manage them. These entities give various reasons for storing waste, including allowing short-lived radioactive materials to decay to innocuous levels to avoid the need for disposal in a more expensive LLRW facility, the prohibitively high cost of disposal for some licensees, and concerns about the potential liability of sending the waste to a disposal site. Universities and biomedical companies generally rely on storage for decay for their LLRW, although finding space within large research institutions in urban settings is more difficult. The high cost of LLRW disposal can also pose financial problems for some licensees. Over the last 25 years, disposal costs have risen from \$1 per cubic foot of LLRW to over \$400 per cubic foot, with projections of well over \$1,000 per cubic foot in the future. For some LLRW, the Barnwell disposal facility now charges \$1,625 per cubic foot. These disposal costs can reach hundreds of millions of dollars for utility companies that are decommissioning their nuclear power plants. NRC reported to us that the cost to fully decommission a plant could run as high as \$675 million. Finally, some licensees will not send their LLRW to disposal facilities because they are concerned that the mixing of their waste with other waste might draw them into litigation if the disposal site should ever require cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (commonly referred to as Superfund).

While NRC policy favors disposal rather than storage over the long-term, since the mid 1990s the Commission has allowed on-site storage of LLRW without a specified time limit as long as it is safe. The Commission took this approach in part because LLRW can be stored and the states were not developing any new disposal facilities. NRC's and Agreement States' (that is, states that have taken over the responsibility for regulating radioactive materials from NRC) license and inspection

programs help ensure the safe management of stored LLRW. However, some licensees are concerned that a fire, flood, or earthquake might cause an unintended radioactive release. If an emergency ever should arise from stored LLRW, NRC has authority under the Act to override any compact restrictions to allow shipment of LLRW to a regional or other nonfederal disposal facility, if necessary under narrowly defined conditions, and to eliminate an immediate and serious threat to the public health and safety or to the common defense and security. Since September 11, 2001, the perception of the risks posed by potential use of stored LLRW by terrorists has increased. A recent report found that at least a few radioisotopes of greatest security concern are classified as LLRW. According to the report, while radiological dispersal devices, such as a dirty bomb, are not weapons of mass destruction, they could cause mass disruption, dislocation, and adverse financial consequences associated with decontamination and rebuilding. NRC officials told us that as the volume and duration of stored LLRW increases so might the safety and security risks.

LLRW Minimization and Storage Can Be Costly

Waste minimization and storage can alleviate the need for disposal, but they can be costly. The licensees that we interviewed provided many instances of the high cost of managing LLRW. For example, one university recently built a \$12 million combined hazardous and radioactive waste management facility, of which two-thirds is devoted to processing and temporarily storing class A waste. A medical center official took us to a small (12' × 12') LLRW interim storage and processing room that cost the institution about \$150,000 to construct to meet stringent health and environmental standards. Costs are also associated with operating storage facilities. Representatives from one university system told us that the system spends about \$100,000 annually to maintain its interim storage building in a remote area of the state. Added to the cost of building and operating a storage facility is the cost of securing it. Such costs have been accounted for in higher utility rates, university overhead charges, drug prices, and medical treatments. These costs of doing business are more difficult for some entities to absorb than others. Representatives from several biotechnology companies told us that the industry, particularly the smaller start-up companies, are not prepared for the financial cost of storing and securing LLRW.

No Other Widespread Effects Detected of Shortfall in LLRW Disposal Availability

Notwithstanding the cost of minimizing and storing LLRW, we did not detect widespread national impacts on LLRW generators that have resulted or might result from any disposal shortfalls. In a survey we administered to compact and unaffiliated state LLRW officials regarding documented effects on LLRW generators of any restricted disposal availability, the officials raised few concerns. We then sought information from a broader constituency to determine whether any problems were occurring. We collaborated with medical researchers at the University of Texas to seek information from two overlapping groups involved in LLRW management: the approximately 2,000 subscribers of the RadSafe Listserv, a listserv for radiation safety officers, and the approximately 6,000 members of the Health Physics Society, a scientific and professional organization whose members specialize in occupational and environmental radiation safety. We sought information on any known cases where there have been or might be adverse effects on research activities and clinical practice stemming from costs or difficulties related to the storage and disposal of LLRW. Specifically, we e-mailed questionnaires asking if these factors have caused or might cause a discontinuance or disapproval of any research or clinical endeavors to RadSafe listserv subscribers and placed a notice in the Health Physics Society's newsletter asking for volunteers to answer the same questions we sent to the listserv subscribers. We obtained an extremely low response rate to these questionnaires—14 responses from listserv subscribers and 6 from Health Physics Society members. Because these were a nonprobability sample surveys, the results are not generalizable and can only be used for anecdotal purposes. Of these respondents, only two said that the difficulties associated with LLRW had adversely affected research or clinical practice. Several respondents cited the challenges of dealing with LLRW but also noted that they work around the difficulties through waste minimization, including substituting nonradioactive materials for radioactive materials when possible, and on site storage as needed. The survey results provided no evidence of any widespread effects on research activities and clinical practice stemming from costs or difficulties related to the storage and disposal of LLRW in the last 5 years. Other published information was largely consistent with our findings.

Owing to the uncertainties regarding future disposal availability and the safety and security of storing waste, our report suggested that the Congress may wish to

consider directing NRC to report to it if LLRW disposal and storage conditions should change enough to warrant consideration of new legislation to improve the reliability and cost effectiveness of disposal availability.

THE ACT HAS NOT ACCOMPLISHED GOAL OF PROVIDING
MORE REGION DISPOSAL CAPACITY

The Act has not effectively facilitated the development of additional regional disposal capacity for class A, B, and C wastes. Although a nuclear industry association estimates that expenditures may now have reached approximately \$1 billion on various facility development efforts, only one new commercial LLRW disposal facility has been developed since passage of the Act—the Envirocare facility—and this facility was not developed at the instigation of the compact in which it operates. As we reported in 2004, the conditions dampening any impetus to developing new disposal facilities for class A, B and C wastes have not changed since 1999. These conditions include a combination of factors: significant decreases in commercial LLRW generation, available capacity at the three existing facilities to meet national disposal needs, and rising costs of developing disposal facilities. Developing new LLRW disposal facilities also encountered public and political resistance in states designated to host these facilities.

DOE HAS NOT PROVIDED A DISPOSAL FACILITY FOR GREATER-THAN-CLASS-C WASTE,
BUT IS COLLECTING THIS MATERIAL

In our April 2003 report, we provided information on DOE's efforts to recover and dispose of greater-than-class-C sealed radioactive sources. As you know, since September 11, 2001, there has been a great deal of concern about the control of sealed sources containing radioactive material that are used in medicine, agriculture, research, and industry throughout the United States. The radioactive material in these sources is encapsulated, or sealed, in metal—such as stainless steel, titanium, or platinum—to prevent its dispersal. The small size and portability of the sealed sources make them susceptible to misuse, improper disposal, and theft. If these sealed sources fell into the hands of terrorists, they could be used as simple and crude but potentially dangerous radiological weapons, commonly called dirty bombs.

Certain sealed sources are considered particularly attractive for potential use in dirty bombs because, among other things, they contain more concentrated amounts of radioactive material such as americium-241, cesium-137, plutonium-238, plutonium-239, and strontium-90. Applications of greater-than-class-C sealed sources include portable and fixed gauges used by the construction industry for testing the moisture content of soil, medical pacemakers, medical diagnostics and treatments, gauges used for petroleum exploration, and government and private research and development. While a study by the Idaho National Engineering Laboratory estimates that there currently could be about 250,000 to 500,000 greater-than-class-C sealed sources in the United States, the actual number of greater-than-class-C sealed sources that are no longer wanted is not known because no one kept track of this information.

The Low-Level Radioactive Waste Policy Amendments Act of 1985⁸ requires DOE to provide a facility for disposing of all greater-than-class-C radioactive waste, including greater-than-class-C sealed sources that are no longer wanted by their owners. A permanent disposal facility has not yet been developed, but in the interim, DOE created the Off-Site Source Recovery Project that, since fiscal year 1999, has been recovering unwanted greater-than-class-C sealed sources from their owners and temporarily storing them at the Los Alamos National Laboratory in New Mexico. NNSA officials told us that, to date, the project has recovered over 10,000 sealed sources.

In April 2003, we reported that DOE's Off-Site Source Recovery Project faced three problems that could hinder future recovery efforts. First, we reported that DOE's Office of Environmental Management, which was responsible for the Off-Site Source Recovery Project at the time of our report, had a questionable long-term commitment to the project. The project did not receive full funding because of other higher-priority projects, and officials from the Office of Environmental Management told us that they would have liked responsibility for the project to be placed in another DOE office because of inconsistencies between the mission of the project and the main mission of the Office of Environmental Management to accelerate the cleanup and closure of contaminated DOE weapons development facilities.

Second, we reported that the Off-Site Source Recovery Project was unable to recover any additional sealed sources containing plutonium-239 (which, in sufficient

⁸Pub. L. No. 99-240.

quantity, could be used to fabricate a crude nuclear weapon) because there was no more space at the Los Alamos National Laboratory that met DOE's security standards for storing these sources. As a result, about 150 holders (mostly universities) of over 400 unwanted sources containing plutonium-239 were forced to retain them and keep them properly secured until space became available. In some instances, sealed sources at these facilities were stored in unlocked and open rooms, and most holders expressed their desire to dispose of the sources as quickly as possible. In addition to plutonium-239, at the time of our report, DOE had not approved a means for temporarily storing sources containing strontium-90 and cesium-137.

Finally, we reported that, as of February 2003, DOE's Office of Environmental Management had not made progress toward providing for the permanent disposal of greater-than-class-C radioactive waste, and it was unlikely to provide such a facility by fiscal year 2007 as it had planned because it is not a priority within the office. Specifically, the office had not begun the first step in developing a disposal facility—completing an appropriate analysis as required by the National Environmental Policy Act of 1969 and its implementing regulations. Such an analysis would likely take the form of an Environmental Impact Statement. Officials from DOE's Office of Environmental Management told us that funding had been provided in fiscal years 2002 and 2003 to conduct an environmental analysis, but these funds had been reallocated to other priorities.

Our April 2003 report recommended that DOE determine whether the priority given to the Off-Site Source Recovery Project was commensurate with the threat posed by greater-than-class-C sealed sources and ensure that adequate resources are devoted to the project to cover the costs of recovering and storing these sealed sources as quickly as possible. In addition, we recommended that DOE take immediate action to provide secure storage space for unwanted sealed sources containing plutonium-239, strontium-90, and cesium-137. Furthermore, we recommended that DOE initiate the process to develop a permanent disposal facility for greater-than-class-C radioactive waste as required by the LLRW Policy Amendments Act and develop a plan to ensure the continued recovery and storage of greater-than-class-C sealed sources until such a disposal facility is available.

DOE has made progress addressing the problems we identified. Specifically, to address the problem of the low priority given to the Off-Site Source Recovery Project within the Office of Environmental Management, DOE transferred the project to NNSA in October 2003. Now renamed the U.S. Radiological Threat Reduction Program, the project is managed by NNSA's Office of Global Radiological Threat Reduction and is part of NNSA's larger efforts to secure potential dirty bomb material worldwide. The project has also experienced funding increases following the transfer. According to NNSA officials, the project was appropriated nearly \$2 million in fiscal year 2004 and received an additional \$3.5 million that was transferred by the Secretary of Energy from the Office of Environmental Management. In addition, the project completed spending from an additional \$10 million that the Congress appropriated in August 2002 as part of the 2002 Supplemental Appropriations Act for Further Recovery from and Response to Terrorist Attacks on the United States.⁹ In total, the project spent about \$8 million in fiscal year 2004. In our view, funding for this effort must be sustained for the foreseeable future to continue progress in the recovery of material that potentially could be fabricated into dirty bombs.

With regard to the continued recovery of sealed sources containing plutonium-239, NNSA completed the security requirements for accepting additional plutonium-239 at Los Alamos National Laboratory. NNSA officials also told us that additional storage capacity has become available at the Nevada Test Site for additional plutonium-239 storage. The project began recovering plutonium-239 sources in November 2003. As of September 2004, the project has recovered over 260 sources containing plutonium-239. Although the project estimated at the time of our report that there were over 400 unwanted plutonium-239 sources, NNSA officials told us that about 400 additional excess sources have been identified that will be recovered. Recovered sources are stored at Los Alamos National Laboratory and the Nevada Test Site until they are eventually shipped to the Waste Isolation Pilot Plant in Carlsbad, New Mexico, for permanent disposal. According to an NNSA official, these shipments are due to begin in April 2005.

According to NNSA officials, the project started recovery of large strontium-90 sources in February 2004 and has recovered four of the six known large strontium-90 sources in the United States. The project plans to recover the remaining two large strontium-90 sources in fiscal year 2005. For cesium-137 sources, NNSA officials told us that they are currently working to find commercial partners to leverage

⁹Pub. L. No. 107-206.

existing disposal and recycling options for this material and to securely store cesium-137 sources in the interim.

Finally, in response to our recommendation that DOE initiate the process to develop a permanent disposal facility for greater-than-class-C radioactive waste, DOE transferred the responsibility for developing the environmental analysis from the Office of Environmental Management to DOE's Office of Environment, Safety, and Health. DOE plans to publish an Advance Notice of Intent to prepare an Environmental Impact Statement. This Environmental Impact Statement will evaluate disposal options and other considerations. However, DOE has been unable to tell us when the Advance Notice of Intent will be published or when DOE expects to complete the Environmental Impact Statement.

Mr. Chairman, this concludes my prepared statement. I would be happy to respond to any questions that you or Members of the Committee may have.

The CHAIRMAN. Thank you very much.

Mr. Pasternak, would you proceed.

STATEMENT OF ALAN PASTERNAK, PH.D., TECHNICAL DIRECTOR, CALIFORNIA RADIOACTIVE MATERIALS MANAGEMENT FORUM

Mr. PASTERNAK. Thank you, Mr. Chairman, Mr. Craig, Senator Craig. I appreciate the opportunity to be here today. This hearing is very timely.

I would like to take a moment to thank the members of this committee and former members of this committee for their efforts on behalf of the California proposed facility at Ward Valley over a number of years between 1993 and 1999, when transfer of that land to the State of California was held up by the administration and the Interior Department. Certainly, Senator Domenici, your speech at Harvard in 1997 I thought was right on point.

Going back to Senator Bennett Johnston and Senator Frank Murkowski, efforts by the former chairmen are much appreciated, Senator Craig's efforts, also those of Senator Kyl and Senator Feinstein, to get the Interior Department to move during that period of time.

The national picture as we see it is this. Disposal capacity for low-level radioactive waste is limited and dwindling. On the Nation's present course, by July 1, 2008, public and private organizations and most government agencies that use radioactive materials from 34 to 36 States, the District of Columbia, and Puerto Rico will have no place to dispose of their more radioactive categories of low-level radioactive waste, categories B and C. In this business, July 1, 2008, is tomorrow. It takes a long time to develop a new disposal facility.

Also at that time, July 1, 2008, only one facility will have monopoly control over disposal of the most voluminous and least radioactive category of low-level waste from these States. That of course is the Envirocare facility, which does not take sealed sources and does not take biological wastes, which is a serious concern to the biotech industry and it is I think one of the points unfortunately that the General Accounting Office missed.

In addition, we are not so optimistic about the present situation. Capacity at Barnwell is diminishing. There is a table at the end of my written testimony provided by the State of South Carolina which shows that in fiscal 2007 and fiscal 2008, years in which there are caps of 40 and 35,000 cubic feet respectively, the remaining capacity is under 9,600 cubic feet because of commitments al-

ready made and the Atlanta Compact set-aside. So space at Barnwell is already tight.

Cal Rad Forum, an association of radioactive material users in the four Southwestern Compact States—California, Arizona, and the Dakotas—has long been a supporter of the Policy Act. It was designed to stimulate development of new facilities by encouraging States to form interstate compacts for disposal on a regional basis. In this way it was hoped that a few States would not bear the perceived burden of performing this service for the entire country.

Indeed, the Policy Act was in response to threats from the States of Washington, Nevada, and South Carolina in 1979 to close their disposal facilities. However, in the 24 years since enactment of the Policy Act no new facilities consistent with the requirements of the act, that is fully licensed to dispose of waste classes A, B, and C, have been developed. The Utah facility, as I mentioned, is licensed to receive only a subset of class A wastes, the least radioactive category. It does not accept sealed sources or biological wastes.

With the exception of the State of Texas, all State programs for development of new disposal facilities in the United States have stopped. In fact, in the 24 years the only State to ever issue a license was California, a fact that we take some pride in. Cal Rad forum sponsored the siting legislation. We supported the compact legislation. We defended the license in court.

But we were disappointed that the Clinton administration would not transfer the Federal land at Ward Valley to the State of California, and of course more recently in 2002 action by the legislature and ex-Governor Davis is what caused us to change our position concerning the Low-Level Waste Policy Act. The legislature, at the urging of Governor Davis, passed a law saying California is not going to build a Ward Valley, a facility at Ward Valley.

We have some recommended actions that the Congress might consider to resolve the problem. We would hope that the basis, the record, the 24 years of noncompliance, would encourage the Congress to take action to resolve the problem.

In the near term, the use of the Department of Energy's own disposal facilities for this purpose might find support in the conclusions of a DOE inspector general's report in 2001 that the Department of Energy's disposal facilities are underutilized. The report found that DOE's Nevada and Hanford facilities are being used at less than 50 percent capacity.

A long-term national solution might include congressional authorization for the development and operation of one or two low-level radioactive waste disposal facilities, possibly by the Department of Energy or by a commercial developer, on Federal land under direct regulation by the U.S. Nuclear Regulatory Commission.

At this point I want to say that we do not advocate repeal of the act. We advocate its amendment. The States of South Carolina and Washington have fulfilled their responsibilities under the act. Should their ability to continue to restrict access from outside their compacts, outside the Northwest, the Rocky Mountain, the Atlantic Compact, be eliminated, those States might choose to close those facilities. We are not in support of repeal, but we are in support of amendment. Those States should be allowed, and compacts,

those States and compacts should be allowed to continue to operate as they have under the act, and any other State that is serious about pursuing development of a facility under the terms of the act ought to be able to do so.

We fully support the NRC's regulations at title 10 CFR, 10 CFR 61. Those regulations have proved very good and enhance safety and they have solved the problems that have existed in the past.

I would like to mention briefly four concerns we have about the General Accounting Office report. We have a greater sense of urgency about this issue in both the near term and the long term than we found in the report. I mentioned the fact that Envirocare does not accept sealed sources or biological waste. There is another problem. The Federal Government, the Department of Energy, and in particular the Navy, the nuclear Navy, does depend on commercial facilities. After July 1, 2008, Norfolk Naval Shipyard will not be able to send radioactive waste to Barnwell. This is a problem and I think it is a point that the GAO missed, although in my conversation with Mr. Feehan I understand that they understand that.

We are concerned about the speculation in the GAO report that this thing might happen or that thing might happen. Maybe Envirocare will be licensed to accept B and C wastes. But in May of this year a legislative task force in the State of Utah already recommended against the legislature's acceptance of B and C wastes at Envirocare. A final report will be developed by this November.

Finally, we do not view storage as a panacea, as an option in place of disposal. NRC policies encourage disposal of waste and not indefinite storage. Furthermore, in the case of a business, a company, a biotech company for example, that wants to terminate its license, that wants to move on to a larger facility and terminate its license at the old facility, storage is obviously not a solution. They have to clear the site of all radioactive waste.

Finally, I would invite the committee's attention to the comments of the U.S. Nuclear Regulatory Commission in the GAO report. These comments I felt for a regulatory agency which is often reluctant to get involved in a policy issue, these were very, very strong comments. The agency says: "It is now time for GAO to explore alternatives further because the future availability of disposal capacity and the costs of disposal under the current system remain highly uncertain and low-level waste generators need predictability and stability in the national disposal system."

They point to the fact that nearly 20 years of experience under the act has demonstrated the difficulties in siting and licensing a facility. Not one new facility has developed in this time under the act.

Therefore, we believe it is in the national interest to begin exploring the alternatives that would potentially provide a better legal and policy framework for new disposal facilities for commercial generators of low-level radioactive wastes.

Mr. Chairman and Mr. Craig, I would be happy to respond to any questions you might have.

[The prepared statement of Mr. Pasternak follows:]

PREPARED STATEMENT OF ALAN PASTERNAK, PH.D., TECHNICAL DIRECTOR,
CALIFORNIA RADIOACTIVE MATERIALS MANAGEMENT FORUM

THE NATIONAL PICTURE

Disposal capacity for low-level radioactive waste is limited and dwindling. On the nation's present course, by July 2008, public and private organizations and most government agencies that use radioactive materials in thirty-four to thirty-six states, the District of Columbia, and Puerto Rico will have no place to dispose of their more radioactive categories of low-level radioactive waste. Also at that time, one facility will have monopoly control over disposal of the most voluminous (and least radioactive) category of low-level waste from these states.

Cal Rad Forum believes it appropriate for Congress to revisit the Low-Level Radioactive Waste Policy Act and fashion a solution that assures all users of radioactive materials in the U.S. access to safe disposal facilities.

Today, only three facilities in the U.S. accept so-called "commercial" low-level radioactive waste (LLRW) for permanent disposal. Two of these facilities are fully licensed; one is not. Organizations that rely completely on these disposal facilities include universities, utilities with nuclear power plants, industries including biotech and pharmaceutical companies, medical centers, and state and federal agencies not including the U.S. Department of Energy or its laboratories. (DOE uses one of these facilities—Envirocare of Utah—and also operates its own disposal facilities.) These disposal facilities are in the states of Washington, South Carolina, and Utah. Disposal capacity is limited despite Congress' intent in enacting the Low-Level Radioactive Waste Policy Act in 1980 (Public Law 96-573) and the Amendments Act of 1985 (Public Law 99-240). The Policy Act was designed to stimulate development of new facilities by encouraging states to form interstate compacts for disposal on a regional basis. In this way, it was hoped that a few states would not bear the "burden" of performing this service for the entire country. Indeed, the Policy Act was in response to threats from the States of Washington, Nevada, and South Carolina in 1979 to close their disposal facilities. However, in the twenty-four years since enactment of the Policy Act, *no new facilities, consistent with the requirements of the Act, i.e., fully-licensed to dispose of waste classes A, B, and C, have been developed.* The Utah facility is licensed to receive only a subset of Class A waste, the least radioactive category of LLRW, and was created and operates outside of the compact system.

What is low-level radioactive waste?

The statutory definition of low-level radioactive waste is set forth in Section 2 (Definitions), Title I—Low-Level Radioactive Waste Policy Amendments Act of 1985, Public Law 99-240—Jan. 15, 1986 (Act):

"(9) Low-level radioactive waste.—The term 'low-level radioactive waste' means radioactive material that

"(A) is not high-level radioactive waste, spent nuclear fuel, or byproduct material (as defined in section 11e(2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(e)(2))); and

"(B) the Nuclear Regulatory Commission, consistent with existing law and in accordance with paragraph (A), classifies as low-level radioactive waste."

LLRW is waste generated by the use of radioactive materials in industrial, academic, research, medical, and governmental activities, nuclear power generation, and facility and site decontamination. LLRW consists of radioactively contaminated clothing, tools, laboratory equipment, machinery, filters from nuclear power plants, rubble and dirt, etc.

What is disposal?

"(7) Disposal.—The term, 'disposal' means the permanent isolation of low-level radioactive waste pursuant to the requirements established by the Nuclear Regulatory Commission under applicable laws, or by an agreement State if such isolation occurs in such agreement State."—P.L. 99-240, Section 2 (Definitions).

What are state and federal responsibilities for disposal of low-level radioactive waste?

State and federal responsibilities for disposal of LLRW are set forth in Section 3 of the Act:

"Section 3(a)(1) State Responsibilities. [Quoted in part]—Each State shall be responsible for providing, either by itself or in cooperation with other States, for the disposal of

"(A) low-level radioactive waste generated within the State (other than by the Federal Government) that consists of or contains class A, B, or C radioactive waste

as defined by section 61.55 of title 10, Code of Federal Regulations, as in effect on January 26, 1983;

“(B) low-level radioactive waste described in subparagraph (A) that is generated by the Federal Government except such waste that is—

“(i) owned or generated by the Department of Energy;
 “(ii) owned or generated by the United States Navy as a result of the decommissioning of vessels of the United States Navy; or
 “(iii) owned or generated as a result of any research, development, testing, or production of any atomic weapon; and

“(C) low-level radioactive waste described in subparagraphs (A) and (B) that is generated outside of the State and accepted for disposal in accordance with sections 5 or 6.”

Section 3 goes on to describe *federal disposal responsibilities* in Section 3(b)(1). These include greater than Class C low-level waste, low-level waste owned or generated by the Department of Energy, waste owned or generated by the United States Navy *as the result of de-commissioning of vessels* of the United States Navy, and low-level waste owned or generated by the Federal Government as a result of any research, development, testing, or production of any atomic weapon.

It should be noted that in addition to its statutory responsibilities the federal government, through the Department of Energy’s Off-Site Source Recovery Program at the Los Alamos National Laboratory, has taken on the responsibility to collect and safeguard sealed radioactive sources that would otherwise be orphaned.

Today’s situation for disposal of low-level radioactive waste: Barnwell, South Carolina; Richland, Washington; and Envirocare of Utah (Clive, Utah).

1) The low-level radioactive waste disposal facility at Barnwell, South Carolina¹ is the regional disposal facility for the Atlantic Compact. On July 1, 2008, use of the South Carolina disposal facility will be restricted to the three member states of that Compact: South Carolina, New Jersey, and Connecticut. South Carolina law also establishes annually decreasing limits on waste volumes that can be accepted for disposal prior to July 1, 2008. (Please see chart on page 7.) The South Carolina Senate recently rejected a proposal to raise the volume cap for fiscal year 2004-2005 by 100,000 cubic feet of Class A waste in exchange for a payment of \$6 million by the facility operator.

Today, in addition to the three states of the Atlantic Compact, users of radioactive materials in thirty-six states which are not members of the Northwest, Rocky Mountain, or Atlantic Compacts rely on Barnwell as the only facility where they can dispose of their Class B and Class C (more radioactive) wastes. The low-level wastes sent to Barnwell from these thirty-six states account for 93% of the radioactivity (measured in curies) disposed of by users of radioactive materials in all states at all three disposal facilities.²

2) The Richland, Washington facility³ is the regional disposal facility for the Northwest Compact. In 1993, under provisions of the Act, use of this facility was restricted to the eight member states of the Northwest Compact, and, subsequently, by contract, the three states of the Rocky Mountain Compact were granted access.

3) The disposal facility at Clive, Utah⁴ accepts only a subset of Class A waste, the least radio-active category, from all states except those in the Northwest and Rocky Mountain Compacts. This facility is not licensed to dispose of sealed sources or biological tissue waste. A proposal to expand the license to include waste Classes B and C was put on hold in 2001 when it failed to gain the approval of the Governor and Legislature as required by Utah law. A legislative Task Force is considering the Class B and C disposal issue. On May 18, 2004, the Task Force made a preliminary recommendation against Utah’s acceptance of Class B and C waste. A final recommendation is expected in November 2004.

With the exception of Texas, all state programs for development of new disposal facilities in the U.S. have stopped.

In 24 years, the states have not demonstrated the political will necessary to implement the Policy Act and develop new disposal facilities. Since enactment of the

¹ Operated by the Chem Nuclear subsidiary of GTS Duratek and regulated by the State of South Carolina which is an Agreement State.

² Manifest Information Management System <<http://mims.apps.em.doe.gov>>. Figures are for FY 2003, 7/1/02 to 6/30/03.

³ Operated by US Ecology, Inc. and regulated by the State of Washington which is an Agreement State under the Atomic Energy Act.

⁴ Operated by Envirocare of Utah and regulated by the State of Utah, which is an Agreement State.

federal Policy Act, only one state has issued a full license (waste Classes A, B, and C) for a new disposal facility. In 1993, The California Department of Health Services (California's Agreement State Agency) issued a license for a disposal facility at a remote location on federal land in the Mojave Desert called Ward Valley. The facility has never been built. Ward Valley was intended as the regional disposal facility for the Southwestern Compact (Host State California, Arizona, North Dakota, and South Dakota). On September 12, 2002, California Governor Gray Davis signed into law a prohibition on the development of the Ward Valley regional LLRW disposal facility.

Summary of the national low-level radioactive waste disposal problem:

Beginning July 1, 2008, when use of the South Carolina facility is restricted to the Atlantic Compact, organizations that use radioactive materials in the District of Columbia, Puerto Rico, and at least thirty-four, and possibly thirty-six states, which are not members of the Northwest, Rocky Mountain, or Atlantic Compacts will have no place to dispose of their Class B and C low-level waste. These are the more radioactive categories of low-level waste whose disposal is a state responsibility. At that time, only the Utah facility will accept a subset of their Class A low-level waste—not including biological tissue wastes or sealed sources. While about 97% of the low-level waste volume from these thirty-six states goes to Utah, the remaining 3%, by volume, currently disposed of at Barnwell, contains over 99% of the radioactivity from these states.

Even prior to July 1, 2008, space at the Barnwell disposal facility will be very limited, especially in fiscal years 2007 and 2008 as shown in the chart on page 7. (See "Remainder" entries after allowing for the "Committed" volumes and the Atlantic Compact "Set asides.") This is due to the declining statutory volume caps.

Litigation against compact Host States

Failure by Compact Host States to fulfill their obligations to develop regional disposal facilities has resulted in two lawsuits by Compact Commissions and one by a facility development company.

The Central Interstate Compact Commission sued Host State Nebraska alleging bad faith and political manipulation of the State's regulatory decision to reject a license application to develop a disposal facility in Boyd County. The Commission asked for recovery of monetary damages and appointment of a special master to complete the review of the license application. The U.S. Supreme Court rejected Nebraska's attempt to seek refuge in the doctrine of sovereign immunity. At trial, the federal District Court in Nebraska found against the State and awarded the Commission \$151 million. However, the judge declined to involve the court in an attempt to complete the proposed disposal project as requested by the Compact Commission. Nebraska appealed the damages award, however the Circuit Court of Appeals upheld the trial court's judgment including a finding of "bad faith." The State of Nebraska and the Central Inter-state Compact Commission recently settled the suit for \$141 million. Evidently, Nebraska would rather forfeit \$141 million than build a disposal facility.

In May 2002, the States of Alabama, Florida, Tennessee, and Virginia joined the Southeast Compact Commission in a lawsuit against Host State North Carolina for its failure to develop a disposal facility. The Supreme Court has taken original jurisdiction of this lawsuit.

In May 2000, the State of California's licensee for development and operation of a low-level waste disposal facility sued the State seeking recovery of monetary damages. Trial was earlier this year, and the trial court denied the claim. The court declined to reconsider its decision, and the licensee filed a notice of appeal to the State Appellate Court.

None of the lawsuits described above is likely to lead to development of a new disposal facility.

Recommended action to avoid the coming crisis in low-level waste disposal: Amend the Policy Act to provide a role for the federal government in assuring availability of safe disposal capacity for low-level radioactive waste.

In 24 years, the Low-Level Radioactive Waste Policy Act has yielded 10 interstate compact commissions, three lawsuits, and *no new disposal facilities*. Based on the states' track record, Congress and the Administration might reasonably conclude that the states have failed to provide the necessary disposal infrastructure and are

unlikely to do so.⁵ Hopefully, a conclusion that the states won't do the job and that the nation does not need ten low-level waste disposal facilities would lead to a decision to amend (not repeal) the Act and that the federal government should assume responsibility for disposal of "commercial" low-level radioactive waste—at least for those thirty-six states not in compacts with existing regional disposal facilities, the District of Columbia, and Puerto Rico. Near-term use of the Department of Energy's own disposal facilities for this purpose might find support in the conclusions of a DOE Inspector General's report that the Department's disposal facilities are underutilized.⁶ The report found that DOE's Nevada and Hanford facilities are being used at less than 50 percent capacity.

A long-term national solution might include Congressional authorization for the development and operation of one or two LLRW disposal facilities, possibly by the Department of Energy or commercial entities, on federal land, under direct regulation by the U.S. Nuclear Regulatory Commission.

Although ten interstate compacts have received congressional consent, the nation does not need ten disposal facilities for LLRW. (In addition, seven states are not members of interstate compacts.) There never was an economic justification for the Policy Act. Regional equity was both the rationalization for the Act and an incentive to develop new disposal facilities. But this incentive (carrot) has not been sufficient to inspire the political will necessary to do the job. When the U.S. Supreme Court struck-down the "Take Title" provision, the Act lost its "stick." Furthermore, volumes of commercial (non-DOE) LLRW have declined since 1980. Economics justifies a few disposal facilities each with large capacity rather than many facilities each with small capacity.

The States of South Carolina and Washington have provided disposal capacity consistent with the requirements of the Policy Act and their compact obligations. Any amendment to the Act should allow these States and their compacts to continue to do so. As well, Texas or any other state that pursues development and operation of a disposal facility pursuant to the Act should also be able to do so.

SAFETY OF LLRW DISPOSAL

Comprehensive regulations of the U.S. Nuclear Regulatory Commission

Disposal of LLRW has been carried out safely and justifies current and future use of near surface disposal pursuant to the NRC's regulations at title 10 part 61 of the Code of Federal Regulations. The still-operating disposal facilities at Barnwell, SC and Richland, WA have operated safely for many years. Such problems as have occurred at old facilities, e.g., migration of tritium due to disposal of liquid wastes at the Beatty, NV disposal facility which was closed in 1993, are addressed by the current regulations. These regulations, adopted in 1982, are comprehensive. Among the issues addressed are disposal site selection criteria, facility design, waste classification, waste form and packaging (e.g., requirements for solidification of liquids), financial assurances, and long-term post-closure institutional controls.

The recent report by the U.S. General Accounting Office contains errors and understates the urgency of the problem.

A report by the U.S. General Accounting Office ("Low-Level Radioactive Waste: Disposal Availability Adequate in the Short Term, but Oversight Needed to Identify Any Future Short-falls," GAO-04-604, June 2004) understates the urgency of the LLRW disposal situation in both the short term (prior to July 1, 2008) and the long term. The report also contains significant errors. For example, the report fails to recognize that the Envirocare facility in Utah is not licensed to dispose of biological tissue waste. The report also misstates federal law by saying that States are not responsible for disposal of waste produced by the nuclear propulsion component of the Department of the Navy. Disposal of wastes owned or generated by the Department of Energy and from the *decommissioning* of naval vessels is a federal responsibility.⁷ But wastes from the Navy's operating fleet are disposed of at commercial facilities (e.g., Barnwell, SC). After July 1, 2008, the Navy and other federal agencies, state governments along with commercial organizations and public institutions that generate radioactive waste outside of South Carolina, New Jersey and Connecticut will not be able to dispose of their radioactive waste at Barnwell, SC.

⁵ See, for example, the Audit Report, "National Low-Level Waste Management Program," DOE/IG-0462 by the U.S. Department of Energy, Office of Inspector General's Office of Audit Services, February 2000.

⁶ "Utilization of the Department's Low-Level Waste Disposal Facilities," DOE/IG-05-5, May 25, 2001. 5

⁷ See P.L. 99-240, Sections 3(a)(1) and 3(b)(1) as discussed on page 2 of this testimony.

The GAO report speculates that various solutions to the LLRW disposal problem may develop without action by the Congress. For example, the report speculates that the Envirocare of Utah facility might be licensed to dispose of Class B and C wastes. But, last May, a task force of the Utah Legislature issued a preliminary recommendation against B and C disposal. (A final task force report is due in November.)

Underlying the GAO report's conclusions is the mistaken belief that storage of wastes is an adequate alternative to disposal. While temporary storage of low-level waste can be and is being safely performed, only disposal is a permanent solution. Furthermore, in the case of de-commissioning of facilities where radioactive materials have been used, on-site storage is obviously not even a temporary option as the wastes must be removed from the site and safely disposed of. Facility decommissioning is a frequent occurrence, particularly in the industrial sector. NRC policy is that radioactive wastes should be disposed of and not stored indefinitely.

The need for Congress to revisit the Low-Level Radioactive Waste Policy Act is urgent.

Time is of the essence. July 1, 2008 and the end of disposal in South Carolina for LLRW from thirty-six states, the District of Columbia, and Puerto Rico are not far off. It took California thirteen years from enactment of enabling legislation in 1983 to issue the Ward Valley license (1993) and successfully defend the license and the Environmental Impact Report in State Courts (1996).

Assurance that future disposal capacity will be available is vital. Lack of such assurance has already curtailed some uses of radioactive materials in research. In Cal Rad's view, the comments of the U.S. Nuclear Regulatory Commission on the GAO report (Appendix V of the Report) are on point and are probably the most valuable part of the report:

"The current report is a sequel to GAO's 1999 report, "Low-Level Radioactive Wastes: States Are Not Developing Disposal Facilities" (GAO/RCED-99-238). That report concluded that none of the States' or compacts' efforts to develop new disposal capacity had been successful and the state efforts to do so had "essentially stopped." This earlier report also examined alternatives to the current system for development of new disposal capacity in the U.S., but did not recommend any of them. Appendix II of the current report updates these alternatives. We believe that it is now time for GAO to explore these alternatives further because the future availability of disposal capacity and the costs of disposal under the current system remain highly uncertain and LLRW generators need predictability and stability in the national disposal system. We acknowledge that the potential approval for Envirocare to accept Class B and C wastes and licensing of a LLRW disposal facility in Texas could significantly improve the current LLRW disposal system in the U.S. At the same time, the nearly 20 years of experience under the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPA) has demonstrated the difficulties in siting and licensing a LLRW facility. Not one new facility has been developed in this time under the LLRWPA. Therefore, we believe it is in the national interest to begin exploring the alternatives identified in Appendix II that would potentially provide a better legal and policy framework for new disposal facilities for commercial generators of LLRW."

The nation's low-level waste disposal infrastructure is inadequate and, without action by Congress, will become much worse. Beneficial uses of radioactive materials by industries, re-search and medical institutions, utilities and agencies of state and federal governments are jeopardized by the current and projected future inadequate disposal infrastructure. Lack of disposal capacity could stop or impede some research, medical, and industrial uses of radioactive materials and have a detrimental impact on the quality of life and health.

BARNWELL VOLUME PROFILE—SEPTEMBER 2004

[Cubic Feet]

	FY2005	FY2006	FY2007	FY2008
Site cap	50,000	45,000	40,000	35,000
Committed ...	23,600	23,600	22,400	22,300
Set asides	8,000-11,000	8,000-11,000	8,000-11,000	5,000-9,000
Remainder ...	15,000-18,400	10,400-13,400	6,600-9,600	3,700-7,700

Source: State of South Carolina Budget and Control Board.

CHAIRMAN. Thank you very much.

Senator CRAIG, do you have any questions.

Senator CRAIG. I do have one. Ms. Nazzaro, do you think it is a problem that DOE is sending more of its low-level wastes to commercial disposal sites like Envirocare in Utah?

Ms. NAZZARO. DOE did account for a large portion of the class A waste. However, they are paying the costs that they have negotiated for this service.

Senator CRAIG. Well, the problem in this context—are they using up sites that would be otherwise used by commercial generators?

Ms. NAZZARO. No.

Senator CRAIG. Are they using up capacity?

Ms. NAZZARO. No.

Senator CRAIG. OK.

The CHAIRMAN. Thank you, Senator.

Senator CRAIG. That is all I have now. Thank you.

The CHAIRMAN. To any of you, but I want to start with GAO: Your 2004 report found that there should be no apparent problem with capacity to dispose of class A wastes for at least 20 years as long as the Envirocare disposal facility remains in operation. The primary disposal concerns for the future is therefore the class B and C. How much of the waste is generated annually and by which type of generator? Should we be taking action today to avert a potential disposal crisis for B and C wastes by mid-2008, given the long lead time that is necessary to site, license, and open LLRW disposal facilities?

Given the prevalence of low-level radioactive waste storage today, do we currently have a safety and security problem?

Ms. NAZZARO. To address your first question as to how much of the waste is the B and C waste, 1 percent of the waste that was disposed of in 2003 is B and C waste and 99 percent of that went to Barnwell. In the last 5 years, 88 percent of the B and C waste that went to Barnwell came from utilities, which we feel has secure storage facilities. I myself visited some of the sites and saw adequate security of the storage facilities.

Where there seems to be more of a concern is certainly in the academic and medical community, and as I stated earlier that only accounted for .5 percent or 800 cubic feet. On an annual basis that would be a small closet, like five by four by eight. So we are not talking a lot of waste.

As to the issue on the security, at your direction, we are currently undertaking a study to look at the safety and security of stored waste. One of the issues is that we do not know how much stored waste there is and where that waste is.

The CHAIRMAN. Well, I do not want to start a battle here between the GAO and the testimony of Mr. Pasternak, but I do want to say to you I have given up—I started addressing the GAO two main problems about 10 years ago, 12 years ago. After 3 years I decided to let somebody else take it over, and that is the argument I had. They did.

But the two issues we had then was: one, why should the GAO be making policy recommendations when that was not their charge under Congress's charter; the second one was whether they were really doing studies that were relevant and giving objective find-

ings or whether they were doing studies that some Congressman or Senator wanted and coming up with remarks or comments that pleased that Congressman, either Senator or House member.

To get the attention, we caused an effort around here to reduce the funding, which occurred. We were at that point amazed, incidentally, at the breadth of activity and where you were located. It turned out you were all over the world. But I want to tell you that I will review the concerns that you have about their studies and we will have our committee staff do that, because what we want are facts. We do not want the GAO telling us what the policy should be. We ought to get that from people who are involved in putting these things together, not the GAO, which is auditing.

So I am not going to ask you to comment on that. If you feel compelled to, Ms. Nazzaro, I will let you.

Ms. NAZZARO. All I will do is direct you to an appendix in our report that does talk about options. We did not want to go so far, as you say, to make a policy recommendation, but there are options in our report for the Congress to consider. We discussed retaining the compact legislation, to repeal the compact legislation, or to turn this responsibility over to the Department of Energy, and we present some pros and cons for each option.

Our major concern with the Department of Energy is that there is a number of items that would need to be resolved before DOE could take on this responsibility. It is not clear whether DOE is authorized to take on that responsibility, who would be responsible for the disposal costs, would DOE keep the funds or would this money return to the Treasury, who would license or regulate such a facility, and would DOE be in competition with existing facilities. This could actually affect the viability of some commercial entities.

We know there is excess capacity at some of the DOE facilities, particularly Hanford and the Nevada test site. However, these States have objected in the past to the disproportionate burden that has been placed on them or would be placed on them should such an action take effect.

The CHAIRMAN. Mr. Pasternak, would you like to comment?

Mr. PASTERNAK. Yes, I would, Mr. Chairman.

We are mindful of the fact that Nevada and Washington have what is probably perceived to be an excessive burden in this area, which is one reason we suggest that the use of DOE facilities might be only a short-term solution. I believe there are DOE disposal facilities in other States as well and I cannot recall at the moment which States they are, so maybe they are worth looking at.

The long-term solution again we suggest is for the development of a facility somewhere on Federal land, under direct regulation by the NRC, by the Federal Government. In our view this is really a matter of political will. The States have not demonstrated the political will. California had the political will for a while and lost it in the year 2000. I think it is a matter of political will.

We do not need ten disposal facilities. We have ten compacts. We need B and C, we need additional B and C disposal. We need class A that can accept all kinds of class A, including sealed sources and biological tissue waste, which Envirocare will not accept now. As I think I mentioned, the fact that they cannot has already affected certain kinds of research.

The CHAIRMAN. Thank you very much.

I have about 12 additional questions. They are directed at each of you, two or three of them directed at GAO. I am going to put them in the record.

I want to say that, even though these hearings are early, next year we intend to address it. We do not want to wait much longer. We have our own problem with will. You know, you have got to get started pretty early to develop the will on this.

I would think that we do have a few more people up here that are not so afraid of these kind of issues. I like your suggestion. It is a practical one. We have a lot of public land. I am not talking about harming very desirable public land at all, nor are you. That is, not a wilderness, it is not beautiful areas. We have huge amounts of property that are just ordinary land right next to private land.

Mr. PASTERNAK. If I might interject, Ward Valley was not pristine wilderness either. It is the site of a large substation and power lines. It was not pristine wilderness.

The CHAIRMAN. Now, I am going to submit these questions for the record and I am going to ask, in terms of you, Mr. Pasternak and the GAO, I am very interested in getting assurance from you that as we work on the legislation that you will participate with us, including recommendations as to who we ought to ask to give us field observations about this.

Mr. PASTERNAK. Absolutely. It would be a privilege to do so.

The CHAIRMAN. And I think the sooner the better, because your Utah, what you talked about in Utah, Senator Craig and I were just talking about that and we do not want a preemptive situation where nobody is left, and that has occurred in the past.

Senator Craig.

Senator CRAIG. Mr. Chairman, let me certainly support what you have just suggested, because in your case, Mr. Pasternak, where you do not want to see repeal of the Low-Level Waste Policy Act for the States. Obviously, the development is not going forward. My question is ultimately what do we do. How do we cause this to be encouraged? I think you have made some proposals, and that is the dilemma we are going to face. We have an obvious issue out there that must get resolved.

Thank you.

The CHAIRMAN. I want to thank personally on our side Clint Williamson of our staff for all the time he spent on putting this together, and Jonathan Epstein on the minority side spent a lot of time. He is sitting right here. We want both of their names in the record as having spent a lot of time.

This is not an issue for them that they wake up every morning saying: My, is it not wonderful I have this issue. It is a little bit difficult, and it is pretty far off. So I am sure they are doing this because they have been kind of ordered to. Nonetheless, you have to do some of those things around here.

Thank you very much. We will continue on at a later date.

[Whereupon, at 11:32 a.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

GOVERNMENT ACCOUNTABILITY OFFICE,
NATURAL RESOURCES AND ENVIRONMENT TEAM,
Washington, DC, October 22, 2004.

Hon. PETE V. DOMENICI,
Chairman, Committee on Energy and Natural Resources, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: I am pleased to respond to your letter of October 4, 2004, concerning questions submitted to the record for your Committee's September 30, 2004, hearing on low-level radioactive waste (LLRW). Your questions and our answers are below.

This concludes our response to your questions and those of the other senators. If you desire further elaboration or clarification, please contact me at (202) 512-3841.

Sincerely yours,

ROBIN M. NAZZARO,
Director.

[Enclosures.]

QUESTIONS FROM SENATOR DOMENICI

Question 1. Your June 2004 report found that there should be no apparent problem with capacity to dispose of class A waste for at least 20 years, as long as the Envirocare disposal facility remains in operation. The primary disposal concern for the future is therefore with class B and C wastes.

How much of this waste is generated annually and by which type of generator?

Answer. No national data are available on the volume of LLRW produced annually. As we indicated in our June 2004 report,¹ according to data provided by the three commercial LLRW disposal facility operators, disposal volumes of class B wastes declined 47 percent, from about 23,500 cubic feet in 1999, to about 12,400 cubic feet in 2003. Class C wastes disposal volumes were more volatile, changing as much as 107 percent in a single year. The total annual disposal volume of class C waste alternatively rose and fell between 1999 and 2003, with the annual total reaching over 20,000 cubic feet in 1999, falling as low as about 11,000 cubic feet in 2002, then rising over 23,000 cubic feet in 2003. Our analysis using MIMS data between 1999 and 2003 indicated that about 88 percent of the commercially disposed class B and C wastes at Barnwell came from utilities. The remaining 12 percent of these wastes were distributed among the other generators: 0.5 percent was attributed to academic and medical, 2 percent to government, and 9.5 percent to industry waste generators. As an illustration, the volume of disposed class B and C wastes from academic and medical generators averaged about 160 cubic feet per year, enough to fill only a 4' x 5' x 8' closet annually.

Question 2. Should we be taking actions today to avert a potential disposal crisis for class B and C wastes by mid-2008, given the long lead-time necessary to site, license, and open a new LLRW disposal facility?

¹GAO, *Low-Level Radioactive Waste: Disposal Availability Adequate in the Short Term, but Oversight Needed to Identify Any Future Shortfalls*, GAO-04-604 (Washington, D.C.: June 9, 2004).

Answer. Even if most states do not have disposal access for their class B and C wastes after mid-2008, we found an immediate crisis would not occur because licensed users of radioactive materials can continue to minimize waste generation, process waste into safer forms, and store on-site waste pending the development of additional disposal options. However, disposal is still the preferred management approach for LLRW, and therefore a disposal option for class B and C waste must be available in the long-term. Our June 2004 report discussed four situations that might have implications for long-term disposal availability. What we currently know is that (1) South Carolina has not shown any shift in its decision to close the Barnwell disposal facility to non-compact member states by mid-2008; (2) the Utah legislative task force is expected to recommend that Envirocare not be approved to use its license to accept class B and C wastes, but the final decision rests with the Governor and legislature; (3) licensing the Texas disposal facility could occur as early as 2007, but Texas has not decided whether any non-compact states will be allowed to use this facility if it is opened; and (4) Nebraska and the Central Interstate Compact have settled their legal dispute, but uncertainties remain regarding the development of any new disposal facility.

Although no shortfall in disposal availability appears imminent, uncertainties remain about future access to disposal facilities. Even with the prospect of new disposal options, there is no guarantee that they will be developed or be available to meet national needs for class B and C waste disposal. Therefore, continued federal oversight of disposal availability and the conditions of stored waste is warranted. Thus, we suggested that the Congress consider directing the Nuclear Regulatory Commission (NRC) to report to it if LLRW disposal and storage conditions should change enough to warrant congressional evaluation of alternatives to ensure safe, reliable and cost effective disposal availability.

Question 3. Given the prevalence of LLRW storage today, do we currently have a safety and security problem?

Answer. We are currently examining for the Committee the safety and security of stored LLRW. NRC and the Agreement States have licensing and inspection programs for assuring that stored waste is safe. However, since September 11, 2001, the perception of the risks posed by potential use of stored LLRW by terrorists has increased. NRC officials told us that, as volume and duration of stored LLW increases, so might the safety and the security risks. Further, as NRC indicated in its comments to our June 2004 report, it is taking actions to identify radioactive materials of concern, including LLRW, and to enhance their safety and security. According to NRC, once implemented, such actions will adequately ensure the safety and security of radioactive materials, including stored LLRW. We plan to explore these issues further in the course of our current work for the Committee.

Question 4. I understand that while you reported problems with the reliability and usefulness of DOE's MIMS database and recommended that DOE stop its dissemination of MIMS data until these problems are corrected, DOE has no plans to do so.

What is your reaction to DOE's position?

Answer. We are disappointed that DOE has not taken the necessary actions to halt dissemination of information contained in its online national LLRW database as long as the database has internal control weaknesses and shortcomings that adversely affect its usefulness and reliability. In commenting on our report, DOE did not address the internal control weaknesses or the reliability of the data. Instead, DOE focused on the use of these data by state and regional compacts. DOE asserted that halting dissemination of these data would evoke sharp criticism from these users. However, as noted in our June report, we surveyed these users and found a consensus that they could more effectively regulate and monitor LLRW if MIMS offered more comprehensive and reliable data. As such we stand by our recommendation that the Secretary of Energy halt dissemination of information from the MIMS database until the internal control weaknesses and shortcomings are corrected.

Question 5. GAO suggests in the report that Congress consider directing NRC to report to it when conditions in waste disposal and storage might change enough to warrant congressional intervention.

Do you still feel that this is appropriate?

Answer. Yes. In our response to agency comments to the June 2004 report, we explained why we disagreed with NRC's position that it would be outside its mission to undertake such reporting. We noted that NRC is responsible for overseeing the use, storage, and disposal of radioactive materials and that NRC and Agreement state agencies have licensing and inspection programs to monitor the safety and security of stored waste. We also noted that NRC has begun to establish an interim database for sealed sources, some of which become LLRW. As such, we concluded

that NRC is the most appropriate agency to determine when congressional assessment of legislative options to ensure disposal availability for LLRW. In addition, NRC's strategic plan for fiscal years 2004 through 2009 calls for it to "assess the key issues affecting the safe management of civilian low-level waste disposal to ensure that potential disruption in access to the three licensed disposal sites does not adversely affect licensees' ability to operate safely and decommission their plants safely." This assessment can only be achieved by monitoring waste levels. This type of monitoring is in line with the International Atomic Energy Agency's position that sound and responsible waste management requires not only appropriate technical and administrative infrastructure but also the establishment of comprehensive and up-to-date waste inventories.

Question 6. Annual low-level disposal volumes have increased significantly in recent years, primarily the result of cleaning up DOE sites. The GAO states in its report that it chose to rely on disposal data from the three commercial disposal operators because the database does not include DOE waste volumes sent to commercial disposal and it is not up to date. In a letter to me dated September 2, 2004, from DOE, the MIMS Internet site states that the database "currently contains some inaccuracies identified during a review by the [Government Accountability Office]."

In your testimony, you stated that the MIMS database should be up to date on December 31, 2004. Why is it taking so long, the GAO report was released in June, the MIMS website on Monday and Tuesday of this week still said there were still inaccuracies?

Answer. The reference to the December 31, 2004 completion date to correct MIMS was provided in the DOE testimony. We defer to DOE to respond to this question.

QUESTIONS FROM SENATOR BUNNING

Question 1. In its report, the GAO indicated that the Department of Energy's low-level waste database was unreliable.

What are the requirements for DOE with its database?

Answer. The Low-Level Radioactive Waste Policy Act, as amended, directed DOE to develop a computerized database to monitor the management of LLRW (sec. 7(1)) but did not specify what should be included in this database. However, in section 7(2), the Congress required the Secretary to annually prepare and submit to it a report addressing issues that, in our opinion, could only be addressed through a more comprehensive national LLRW database than DOE developed. For example, the report was to summarize the (1) data on the total amount of low-level waste shipped for disposal on a yearly basis, (2) proportion of such wastes subjected to volume reduction, (3) average volume reduction attained, (4) proportion of wastes stored on an interim basis, and (5) interim storage and final disposal volume requirements anticipated for the following year, on a regional basis. The only data MIMS captured are the volume, waste class, and generator of low-level waste that is accepted for disposal at the three commercial disposal facilities.

Question 2. Why is DOE's database so unreliable?

Answer. The MIMS database is unreliable primarily because DOE does not have consistent and comprehensive internal controls to provide confidence in the reliability of the data. For example, DOE has taken no responsibility for verifying the accuracy of the data supplied by the disposal facility operators to be entered into the MIMS database. Such verification efforts would likely uncover errors in attribution of LLRW generation to states, compacts, and generator types. No government agency should be providing data to the public that has not been tested for its reliability and validity.

Question 3. What effect has this had on predicting future waste needs?

Answer. MIMS is not a useful tool for estimating future waste streams because it only records the LLRW that is shipped for disposal and does not include DOE waste. To be useful in estimating future disposal capacity needs, MIMS would need to include the volumes of LLRW generated and stored and it would need to include DOE waste since DOE accounts for such a large percentage of the waste volume.

Question 4. GAO found some of the problems with determining future waste disposal needs resulted from the difficulty of forecasting DOE's and nuclear facilities' disposal shipments.

How could DOE and nuclear facilities improve the forecasting of their disposal shipments?

Answer. In our report, we discussed the uncertainties regarding the timing and volume of LLRW needing disposal in the future, which largely will depend on the disposal decisions made by nuclear utility companies and DOE. We noted that the pace of nuclear power plant decommissioning has been slower than expected and

thus the amount of LLRW generated has decreased. The current economics of electricity generation has made it more desirable to keep nuclear plants in service and, as a result, only a small number of plants are expected to be decommissioned in the next 20 years or more. Moreover, we noted that the nuclear power industry has aggressively minimized the amount of LLRW it produces from plant operations. Our report also found that the volumes of DOE waste will likely start declining after 2006 and stay comparatively low until another anticipated spike in 2014. DOE officials stressed, however, that “high confidence numbers” are not yet available because the department is still in the process of reorganizing and developing new baselines for its cleanup projects, and it does not have a management system in place to develop corresponding waste projections.

Question 5. Many facilities with low-level waste are concerned that if any of the remaining disposal facilities close, their main problem will be lack of price competition.

Do you agree with this assessment?

Answer. Regardless of any future closure of disposal facilities, there is essentially no price competition today. As we reported in June, Envirocare of Utah received 99 percent of class A waste and Barnwell received about 99 percent of the class B and C wastes that were sent to commercial disposal in 2003. As long as there are no time limits on LLRW storage, licensees will compare the cost of waste minimization and storage against the cost of disposal in deciding if or when to get rid of their LLRW. In general, the higher the disposal fees, the more incentive to minimize and store LLRW. Disposal operators thus have some limits on the level they set for disposal fees because they need to receive a certain volume of LLRW in order to retain a financially viable commercial operation.

Question 6. If so, how will this affect cleanup at DOE facilities?

Answer. The lack of price competition for commercial disposal of LLRW does not appear to be a factor for DOE. We have been told that DOE is able to achieve price volume discounts on the class A waste it ships to Envirocare of Utah. We were also told that if it is more cost effective for DOE field managers to ship class A site cleanup waste to a commercial disposal facility, considering full life cycle costs, they are allowed to do so. If a commercial facility should raise its disposal fees so that it is no longer cost effective for DOE, DOE can always use its own disposal facilities. We understand that capacity at the two DOE disposal facilities does not appear to be an issue in the short or longer term.

QUESTIONS FROM SENATOR AKAKA

Question 1. In your opinion, is the FY 2005 budget request of \$5.6 million for the Off-Site Source Recovery program (OSR) sufficient to continue the progress in collection of the GTCC sources that you noted in your testimony?

Answer. In a September 2004 meeting, the director of the National Nuclear Security Administration’s (NNSA) Office of Global Radiological Threat Reduction told us that \$5.6 million would be sufficient to recover the high-priority sources it has identified for recovery in fiscal year 2005. This amount represents nearly a three-fold increase from the about \$2 million DOE asked for in its fiscal year 2004 budget request. However, \$5.6 million is less than the nearly \$8 million NNSA actually spent on the program in fiscal year 2004. The additional funding above DOE’s \$2 million request was the result of two transfers by the Secretary of Energy totaling \$3.5 million from the Office of Environmental Management to NNSA. In addition, the program completed spending approximately \$2.5 million that remained from the \$10 million appropriated to the program by the 2002 Supplemental Appropriations Act for Further Recovery from and Response to Terrorist Attacks on the United States, Public Law 107-266.

We have not independently analyzed the Office of Global Radiological Threat Reduction’s fiscal year 2005 recovery plans or its estimated costs for conducting these recoveries. Without such an analysis, we are unable to say whether \$5.6 million would be sufficient to complete the program’s planned recoveries or whether additional material needs to be recovered beyond what NNSA currently plans.

Question 2. In your testimony, you stated that the DOE Office of Environmental Management (EM) did not sufficiently prioritize the creation of a permanent disposal site for GTCC radioactive waste. You also noted that DOE transferred this responsibility to the Office of Environment, Safety, and Health. In her testimony at the hearing, Ms. Gelles stated that DOE had decided to transfer the responsibility back to EM.

Do you believe this is the best place for this responsibility? Could you explain why or why not?

Answer. In our April 2003 report,² we reported that DOE had not made progress toward providing a permanent disposal facility for greater-than-Class-C radioactive waste, as required by Public Law 99-240. Specifically, DOE had not decided which office within the agency would begin the first step in developing such a facility, completing the appropriate National Environmental Policy Act (NEPA) analysis, which would likely be an environmental impact statement. DOE had also not provided funding or produced a timeline for completing the NEPA analysis. DOE's Office of Environmental Management had identified funding for completing the Environmental Impact Statement in fiscal years 2002 and 2003. However, the office redirected the funding to other higher priority projects.

Designating the Office of Environmental Management as the responsible office for conducting the NEPA analysis partially addresses our concern that DOE had not assigned responsibility to develop a permanent disposal facility. However, we believe it is equally important that the Office of Environmental Management provide necessary funding and develop a plan that would establish milestones by which progress could be measured; evaluate other potential disposal options; estimate costs and schedules; and address legislative, regulatory, and licensing considerations.

QUESTIONS FROM SENATOR FEINSTEIN

Question 1. Where will waste from California go once Barnwell, South Carolina, stops accepting waste from California (and other) states in 2008?

Answer. If South Carolina follows through with plans to restrict access to the Barnwell disposal facility after mid-2008 and no new disposal capacity is made available, waste generators in California will have no alternative commercial disposal facility for their class B and C wastes. However, as we reported in June, licensed users of radioactive materials can continue to minimize waste generation, process waste into safer forms, and store waste pending the development of additional disposal options. These approaches can be costly, with a higher financial burden on some licensees than others.

Question 2. Your June report suggests no current problem with disposal availability. In my state, a report prepared in 2000 by the former President of the University of California at the request of the Governor reached the following conclusions: "Significantly diminished waste streams from California [since enactment of the Low-Level Waste Policy Act in 1980]—a ten-fold decrease in volume and an over fifty-fold decrease in radioactivity—have made the development of a disposal facility appear less urgent and the projected disposal costs at such a facility less attractive."

I gather that your study is generally consistent with that conclusion about the current adequacy of national disposal capacity and the diminished need for numerous new sites?

Answer. As reported in June 2004, we found that disposal capacity is adequate in the short term, but we did not assess the need for more disposal facilities for reasons other than capacity, such as to possibly increase the reliability and cost-effectiveness of the LLRW disposal system. Our 1999 report did find similar characteristics of LLRW disposal conditions as you indicated from the 2000 California report. We reported that the impetus to develop new disposal facilities has been dampened by a combination of factors, including significant decreases in LLRW generation, available capacity at the three existing facilities to meet national disposal needs, and rising costs of developing disposal facilities. We also reported that the development of new LLRW disposal facilities encountered public and political resistance in states designated to host these facilities. Two changes have occurred since 1999 that we noted in our 2004 report: (1) the increase in waste from DOE's site clean-ups disposed of at the Envirocare of Utah and (2) the possibility that Texas might be the first compact host state to license and open a disposal facility. A representative of the company that recently applied for a license to open a Texas facility told us that provisions to accept DOE waste at this facility are necessary to make it a financially viable operation.

Question 3. Your study indicates in recent years volumes have gone up a bit, but largely due to DOE sending its wastes to commercial disposal sites instead of using DOE facilities.

If a commercial capacity problem were to develop, wouldn't the decision of DOE to send its wastes to non-DOE waste facilities have the effect of reducing capacity available for commercial wastes?

Answer. DOE waste currently sent to a commercial disposal facility is not affecting disposal availability for non-DOE waste. DOE only sends its waste to Envirocare

² GAO, *Nuclear Nonproliferation: DOE Action Needed to Ensure Continued Recovery of Unwanted Sealed Radioactive Sources*, GAO-03-483 (Washington, D.C.: April 15, 2003).

of Utah, which can only accept class A waste. We reported that Envirocare has the capacity for more than 20 years of disposal under its current license, which takes into consideration the waste volumes it receives from DOE. We are not aware of any DOE plans to dispose of its class B and C wastes at Barnwell. As such, DOE is not reducing disposal capacity for other waste generators that ship to this facility.

CALIFORNIA RADIOACTIVE MATERIALS MANAGEMENT FORUM,
Lafayette, CA, October 26, 2004.

Hon. PETE V. DOMENICI,
Chairman, Committee on Energy and Natural Resources, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: On behalf of the California Radioactive Materials Management Forum, I want to thank you for the opportunity to appear before the Senate Committee on Energy and Natural Resources on Thursday, September 30, 2004 to present testimony concerning disposal of low-level radioactive waste.

Thank you also for your letter of October 4, 2004 and the opportunity to respond to your questions and those of Senators Akaka and Feinstein, submitted for the record. The questions and our responses are attached.

Members of Cal Rad look forward to working with you, Committee members, and Committee staff as you consider means to assure access to safe, reliable low-level radioactive waste disposal facilities for commercial, institutional, and governmental organizations that use radioactive materials.

Sincerely,

ALAN PASTERNAK,
Technical Director.

[Enclosures.]

QUESTIONS FROM SENATOR DOMENICI

In 1980, with the creation of the compact system, the thinking at the time was that additional low-level waste disposal sites would be created to keep a shortage of disposal space from occurring.

That doesn't seem to be the case as highlighted in the GAO report. Though Envirocare will be able to handle the nation's Class A level waste for the foreseeable future, there are real concerns about where the Classes B and C level waste, the more dangerous waste, for 34 states will go.

In your view, is the compact system working or not working?

What are the consequences of inadequate storage options for radioactive waste? Are public health and safety problems created when generators have to store their wastes on-site for long periods of time?

In your experience on the issue of low-level waste, what role, if any should the Congress consider in the oversight of LLRW?

RESPONSE

In our view, the compact system is not working as intended by Congress.

The compact system works only for the "fortunate fourteen." These are the eight states of the Northwest Compact region, the three states of the Rocky Mountain Compact region, and the three states of the Atlantic Compact region. Organizations that use radioactive materials and generate low-level radioactive waste in the Northwest and Rocky Mountain Compact regions have access, and will continue to have access for the foreseeable future, to the Richland, Washington disposal facility. Similar organizations in the Atlantic Compact have, and will continue to have, access to the Barnwell, South Carolina disposal facility. Operation of these two disposal facilities precedes passage of the Policy Act.

However, on the nation's present course, organizations that use radioactive materials in the other thirty-six states will have no disposal option for the more radioactive classes of their low-level waste (waste Classes B and C) as of July 1, 2008 when access to Barnwell will be restricted to the Atlantic Compact states. Furthermore, there will be only one facility to which they can send a subset of their Class A waste—Envirocare of Utah. This raises problems of reliability and monopoly control of disposal costs for these wastes. Furthermore, the Envirocare facility is not licensed to dispose of sealed sources or biological tissue wastes.

Since enactment of the Low-Level Radioactive Waste Policy Act in 1980, not a single new facility—licensed to dispose of waste Classes A, B, and C—has been developed. This, despite Congressional consent to ten interstate compacts. Furthermore, all state programs to develop new disposal facilities have ceased with the exception

of the program in Texas for the Texas Compact (Texas and Vermont). Should Texas be successful, the number of states where users of radioactive materials lack access to disposal capacity for Class B and C waste would fall to thirty-four.

The consequences of inadequate disposal options for low-level radioactive waste are serious. Lack of disposal options requires users of radioactive materials to spend money and effort to store their waste on-site for an indefinite period of time. The waste must eventually be disposed of when the facility—nuclear power plant, university or industrial lab, manufacturing plant, or medical or other research institution—is decommissioned. At the time of facility clean up and decommissioning continued on-site storage is, of course, not an option.

On-site storage can interfere with facility operations, particularly if storage space is limited. The added costs of storage may affect costs to ratepayers and other consumers. Current limitations on disposal options have already curtailed some medical research activities.

In its comments on the General Accounting Office report issued last June, the U.S. Nuclear Commission noted that “. . . the future availability of disposal capacity and the costs of disposal under the current system remain highly uncertain and LLRW generators need predictability and stability in the national disposal system.” The NRC calls for exploration of alternatives that “. . . would potentially provide a better legal and policy framework for new disposal options for commercial generators of LLRW.”

From a public health and safety point of view, while low-level radioactive wastes can be safely stored, it is clearly preferable for these wastes to be disposed of at a central, regulated facility than stored at numerous facilities many of which are in urban neighborhoods. Indeed, NRC policy favors prompt disposal of LLRW over indefinite storage. More handling and surveillance activities occur when waste is stored on-site, and these may result in greater occupational exposure to radiation.

The Policy Act, as enacted in 1980 and amended in 1985, provided both a “carrot” and a “stick” to encourage development of new disposal facilities. Interstate compacts were given the authority to limit access to their regional disposal facility to the member states of the compact. The Act also included a “take title” provision requiring states that failed to provide access to disposal facilities to take title and possession of waste generated within their borders. However, in 1992 the Supreme Court struck down the take title provision thereby removing the “stick.”

Given the current situation of limited access to disposal facilities for LLRW, the scheduled loss of access to disposal facilities for the more radioactive classes of LLRW generated in 34-36 states, the 24-year failure of the states to develop a single new disposal facility as called-for in the Policy Act, and the cessation of efforts in the states (with only one exception) to develop new facilities, it seems appropriate for Congress to revisit the Policy Act and fashion a scheme in which the federal government takes such action as will assure the availability of adequate disposal capacity for commercial, institutional, and governmental users of radioactive materials. A national solution for what is now a national problem seems to us advisable.

The nation does not need ten or more LLRW disposal facilities as envisioned in 1980. It does need some additional disposal capacity, especially for Class B and C waste. Cal Rad has suggested that Congress might make existing U.S. Department of Energy disposal facilities available for permanent disposal of commercial waste—perhaps as an interim solution. For a long-term solution, we have suggested that one or two LLRW disposal facilities be developed under the aegis of the federal government, on federal land, and regulated by the U.S. Nuclear Regulatory Commission. We believe these steps can be taken without up-setting the ability of the two existing regional disposal facilities at Richland, Washington and Barnwell, South Carolina to continue operating under the compact system. As well, any state, such as Texas, that wishes to take advantage of the provisions of the Policy Act should be able to do so.

QUESTIONS FROM SENATOR AKAKA

In your testimony you stated that a recent GAO report (GAO-04-604) understates the urgency of the problem of storing and disposing of low-level waste, in part because of an underlying belief that storage is an adequate alternative to disposal.

With respect to GTCC waste, do you believe that a similar urgency exists to recover and dispose of such wastes?

Can you please provide your opinion of S. 1045, a bill to strengthen DOE's capabilities to dispose of all GTCC wastes.

RESPONSE

It is our understanding that most, if not all, Greater-Than-Class-C waste consists of some sealed sources and some of the decommissioning wastes from nuclear power plants. We also understand that eventually GTCC waste will be disposed of at Yucca Mountain, and Cal Rad supports this ultimate solution. In the meantime, the Department of Energy's Off-Site Source Recovery Project fills an important need for recovery and safeguarding of sealed sources of *all* classes: A, B, C, and GTCC. One reason this project is important is that the Envirocare disposal facility at Clive, Utah does not accept any sealed sources for disposal.

S. 1045 notes that the Off-Site Source Recovery Project, which is run by the Los Alamos National Laboratory, is slated to end in 2010. Cal Rad Forum recommends that this DOE project be continued at least until the Yucca Mountain disposal facility is in operation and provision has been made for disposal of sealed sources of all waste classes.

QUESTION FROM SENATOR FEINSTEIN

Where will waste from California go once Barnwell, South Carolina stops accepting waste from California (and other) states in 2008?

RESPONSE

On the present course, come July 1, 2008, there will be no disposal facility at which to dispose of the more radioactive categories of low-level radioactive waste (Waste Classes B and C as defined by the U.S. Nuclear Regulatory Commission) from California and 33-35 other states and only one facility—Envirocare of Utah—to which a subset of Class A waste (least radioactive) can be sent for disposal. The Envirocare facility is not licensed to dispose of biological tissue waste or sealed sources.

While most of the low-level waste *volume* produced in California and other states is Class A, by far most of the *radioactivity* is contained in the relatively small volume of Class B and C waste.

Organizations that use radioactive materials in California, in all generator categories, currently send Class B and Class C waste to the Barnwell, SC disposal facility. These include academic, government, industry, medical, and utility users of radioactive materials. Most of the Class B and C wastes are from utilities and industry.

Wastes for which there is no permanent disposal option will have to be stored, usually at the site where the wastes are generated. These sites include universities, industries, medical centers, government facilities and nuclear power plants. Access to only one facility (Envirocare) for disposal of a subset of Class A waste raises issues of reliability and monopoly control of disposal costs for those wastes.

Had the proposed Ward Valley, California project been allowed to continue to completion, that is where California's low-level radioactive waste, along with LLRW from Arizona, North Dakota, and South Dakota, would have been disposed of. The proposed Ward Valley disposal project had received a license from the California Department of Health Services, a favorable joint federal-state Environmental Impact Report/Environmental Impact Statement from the state and the U.S. Bureau of Land Management, a favorable Supplemental EIS from the BLM, two favorable biological opinions from the U.S. Fish & Wildlife Service with concurrence of the California Department of Fish & Game, and a favorable review by a panel appointed by the National Academy of Sciences. In addition, California's Courts up-held the Department of Health Services' license and decision to certify the EIR. Unfortunately the Ward Valley disposal project fell victim to a lack of political will.

[Answers to the following questions were not received at the time this hearing went to press.]

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC, October 4, 2004.

Ms. CHRISTINE GELLES,
Director, Office of Commercial Disposition Options, Office of Environmental Management, Department of Energy, Washington, DC.

DEAR MS. GELLES: I would like to take this opportunity to thank you for appearing before the Senate Committee on Energy and Natural Resources on Thursday

September 30, 2004, to give testimony regarding issues related to low-level radioactive waste.

Enclosed herewith please find a list of questions which have been submitted for the record. If possible, I would like to have your response to these questions by Monday, October 18, 2004.

Thank you in advance for your prompt consideration.

Sincerely,

PETE V. DOMENICI,
Chairman.

[Enclosures.]

QUESTIONS FROM SENATOR DOMENICI

Question 1. Annual low-level disposal volumes have increased significantly in recent years, primarily the result of cleaning up DOE sites. The GAO states in their report that they chose to rely on disposal data from the three commercial disposal facility operators because the database does not include DOE waste volumes sent to commercial disposal and is not up to date.

In a letter to me dated September 2, 2004, from the DOE, the MIMMS internet site states the database:

“currently contains some inaccuracies identified during a review by the General Accounting Office (GAO).”

In your testimony you stated that the MIMMS database should be up to date on December 31, 2004. Why is it taking so long, the GAO report was released in June, the DOE MIMS website on Monday and Tuesday of this week still said there were still inaccuracies?

How are you going to guarantee that the MIMMS database is kept up to date?

Question 2. In your testimony you state, “the Department currently utilizes commercial disposal for some low-level and mixed low-level waste streams, in cases that it determined to be cost effective and in the best interest of the Department.”

Where is this waste coming from? What commercial facilities are you sending it to? Are you tracking the waste?

QUESTIONS FROM SENATOR BUNNING

Question 1. In its report, the GAO indicated that the Department of Energy’s low-level waste database was unreliable. What are the requirements for DOE with its database? Why is the DOE’s database so unreliable? What effect has this had on predicting future waste disposal needs?

Question 2. The GAO found some of the problems with determining future waste disposal needs resulted from the difficulty of forecasting DOE’s and nuclear facilities’ disposal shipments. How could the DOE and nuclear facilities improve the forecasting of its disposal shipments?

Question 3. Many facilities with low-level waste are concerned that if any of the remaining disposal facilities close the main problem they will face is lack of price competition. Do you agree with this assessment? If so, how will this affect cleanup at DOE facilities?

QUESTIONS FROM SENATOR AKAKA

I understand that the Off-Site Source Recovery Program (OSR) was transferred to the National Nuclear Security Administration (NNSA) in November, 2003. Some of the activities, however, such as the identification of a disposal facility and the environmental assessments necessary to use the facility, remain with other parts of the Department.

Question 1. I understand from your testimony that on September 29th the day before the hearing, the Department designated Environmental Management as being the lead entity for ensuring the safe disposal of greater-than-Class-C (GTCC) radioactive waste, transferring it from the Office of Environment, Safety and Health. Can you provide any formal record of the decision to transfer the responsibility back to Environmental Management?

Question 2. Can you please provide details on how the work is proceeding on the environmental impact statement (EIS)?

Question 3. At the FY 2005 budget hearing on February 10, 2004, the Department testified that the FY 2005 \$3 million budget request for the environmental assessment, plus the availability of prior year funds that were obligated for the assessment, were adequate to complete the EIS. Is it still the case that you will be able to complete the EIS with these funds?

Question 4. Will the Department be exploring disposal alternatives as part of the EIS [e.g. existing facilities vs. new facilities or commercial options]?

Question 5. Can you please provide the Department's views on S. 1045? [The same question is asked of Mr. McGinnis, since part of the Off-Site Recovery program was transferred to NNSA.]

QUESTIONS FROM SENATOR FEINSTEIN

Question 1. Where will waste from California go once Barnwell, South Carolina stops accepting waste from California (and other) states in 2008?

Which federal entity has oversight responsibility for Greater than Class C radioactive waste?

Question 2. What steps are being taken to both track and securely store GTCC waste? Since Los Alamos can no longer accept some of the most highly radioactive waste, where will the waste go?

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC, October 4, 2004.

Mr. EDWARD MCGINNIS,
Director, Office of Global Radiological Threat Reduction, National Nuclear Security Agency, Department of Energy, Washington, DC.

DEAR MR. MCGINNIS: I would like to take this opportunity to thank you for appearing before the Senate Committee on Energy and Natural Resources on Thursday September 30, 2004, to give testimony regarding issues related to low-level radioactive waste.

Enclosed herewith please find a list of questions which have been submitted for the record. If possible, I would like to have your response to these questions by Monday, October 18, 2004.

Thank you in advance for your prompt consideration.

Sincerely,

PETE V. DOMENICI,
Chairman.

[Enclosures.]

QUESTIONS FROM SENATOR DOMENICI

Question 1. In April 2003, the GAO released a report, GAO-03-483, *Nuclear Non-proliferation, DOE Action Needed to Ensure Continued Recovery of Unwanted Sealed Radioactive Sources* addressing the issue of sealed sources containing greater than class C waste. In April 2003, the GAO reported that the exact number of unwanted greater-than-Class-C sealed sources in the United States was unknown as no one kept track of this information.

Is someone keeping track or taking an inventory now?

Question 2. Also, in the same report, the GAO, stated that after more than 17 years after the enactment of The Low-Level Radioactive Waste Policy Amendments Act of 1985, DOE had not made progress toward providing for the permanent disposal of greater-than-Class-C radioactive sealed sources, as required by the act.

Has the DOE been able to determine the volumes of greater-than-Class-C waste in the United States? Has the DOE been able to designate where the greater-than-Class-C waste will be disposed of?

Question 3. In your testimony for the disposal of waste you say that "the use of commercial pathways makes sense for many reasons. They provide a potential and significant economy of cost. They use existing infrastructure, which eliminates the need for certain types of new storage facilities . . ." and so on.

Do you work with the commercial facilities to ensure there is adequate disposal space for the wastes you recover? Is the NNSA concerned that the commercial facilities may run out of room after 2008?

QUESTIONS FROM SENATOR AKAKA

First of all, let me say that I greatly appreciate Secretary Abraham's response to the GAO report I requested in 2002 on the DOE's program to secure and dispose of GTCC sources of nuclear material. I am pleased to see the increased commitment to securing GTCC sources of radioactive waste through a transferring of the OSR program to NNSA and the larger budget requests for FY 2005 and the outyears. My concerns come from the growing black market in radioactives, especially pluto-

nium-239. Many of the sources are not well-secured. The sealed sources need to be identified, secured, and disposed of as quickly as possible. The NNSA is taking steps in the right direction. I have several questions for you on the subject.

Question 1. I am concerned about the plutonium-239 isotopes. Will the storage space that the United States Radiological Threat Reduction Program has identified at Los Alamos and Nevada be adequate to secure all the known sources of plutonium-239? If not, what are the backup plans?

Question 2. I noted your endorsement of developing disposition paths through the commercial sector, including interim storage and recycling for reuse. What are the downsides or obstacles to pursuing commercial disposal, and particularly recycling, of GTCC waste?

Question 3. You stated in your written testimony that the OSR program's budget for FY 2004 was \$1.96 million. But it is my understanding that supplemental funding, in addition to the \$3.4 million you mentioned in your testimony, enabled OSR to work with a much larger operating budget in FY 2004.

Question 4. Can you please provide the program's total operating budget for FY 2004.

Question 5. Can you please provide the Department's views on S. 1045. [same question is asked of Ms. Gelles.]

QUESTIONS FROM SENATOR FEINSTEIN

Question 1. Where will waste from California go once Barnwell, South Carolina stops accepting waste from California (and other) states in 2008?

Which federal entity has oversight responsibility for Greater than Class C radioactive waste?

Question 2. What steps are being taken to both track and securely store GTCC waste? Since Los Alamos can no longer accept some of the most highly radioactive waste, where will the waste go?

APPENDIX II

Additional Material Submitted for the Record

HEALTH PHYSICS SOCIETY,
Los Alamos, NM, September 29, 2004.

Hon. PETE V. DOMENICI,
Chairman, Energy and Natural Resources Committee, U.S. Senate, Washington, DC.

DEAR CHAIRMAN DOMENICI: The Health Physics Society, a scientific nonprofit organization of radiation safety professionals, appreciates that the Senate Energy and Natural Resources Committee is conducting a hearing on Low-Level Radioactive Waste Oversight. The Health Physics Society strongly believes that nuclear technologies enrich the quality of life for our society but the beneficial uses must be balanced against any potential detriment that the waste streams associated with these technologies may pose to human health or the environment. Accordingly, I am forwarding a statement on issues related to management of low-level radioactive waste that the Health Physics Society feels will be of use to your Committee as it provides oversight in this area.

I respectfully request the attached "Public Witness Testimony For The Record by the Health Physics Society" be entered into the record of the Committee hearing on Low-Level Radioactive Waste Oversight.

Sincerely,

RAYMOND A. GUILMETTE, PH.D.,
President.

[Enclosure.]

INTRODUCTION

Mr. Chairman, Ranking Member Bingaman, and distinguished members of the committee, the Health Physics Society (HPS) appreciates the Committee's conduct of a hearing on Low-Level Radioactive Waste Oversight and greatly appreciates the opportunity to submit testimony sharing some of our observations and recommendations regarding the current national policy governing the disposition of Low-Level Waste (LLW).

The HPS strongly believes that nuclear technologies enrich the quality of life of our society. These technologies are used to diagnose medical illnesses without the need for invasive surgeries, treat cancers, conduct research, develop new kinds of pharmaceuticals, preserve our food supply, and generate over 20 percent of our nation's electricity from commercial nuclear power plants. These plants emit essentially no air pollution or greenhouse gases. There is, however, waste associated with these beneficial uses. As a matter of national policy, we believe that the beneficial uses that these technologies provide to our society must be balanced against any potential detriment that these waste streams may pose to human health or the environment.

We have reviewed the information contained in the recent report (GAO-04-604)¹ issued by the Government Accountability Office to your Committee in June 2004 and agree with the majority of its contents. We also believe that the current shortfalls in LLW disposal options are not attributable to any deficiencies in science or technology, but rather to the failure to garner the political resolve required to implement the Low-Level Waste Policy Act of 1980 (LLWPA), as amended in 1985, as directed by Congress.

¹GAO report to the Chairman on the Energy and Natural Resources, U.S. Senate titled "Low-Level Radioactive Waste, Disposal Availability Adequate in the Short Term, but Oversight Needed to Identify any Future Shortfalls," (GAO-04-604), issued June 2004.

THE NATION NEEDS PREDICTABLE LONG-TERM DISPOSAL OPTIONS
FOR CLASS B AND C WASTES

As you are aware, Congress enacted the LLWPA to distribute more equitably to each state the responsibilities for developing disposal capacities for LLW generated within each state's borders. Moreover, this legislation encouraged states to enter into regional interstate compacts with the intent that a single disposal facility would be licensed by a host state, and thereafter, could be used for disposal of LLW by any one of its member states. At the time Congress passed this legislation, only Washington, Nevada and South Carolina had commercial facilities licensed for LLW disposal. Since that time, however, deadlines established for creating a network of new disposal sites have since passed without opening a single new LLW disposal facility.

Three facilities are currently authorized to dispose of LLW in the United States. Of these, only two facilities are authorized to dispose of waste streams comprising the vast majority of the radioactivity in waste generated in this country (Class B and C low-level waste).² One of these commercial facilities, located in Richland, Wash., prohibits access to any state other than the 11 states belonging to the Rocky Mountain and Northwest Compacts.³ Additionally, because of actions taken by state legislators in South Carolina, access to its Barnwell facility will be strictly limited to the three member states of the Atlantic Compact⁴ after 2008. Until then, the 36 states that do not belong to these three compacts may dispose of LLW at Barnwell. After the 2008 deadline, the 36 states will be forced to find costly and less-than-optimal alternatives for disposal of Class B and C low-level waste. Accordingly, many users of radioactive materials have developed plans, or have already constructed facilities, for safe interim storage of the wastes as a hedge against losing access to disposal sites. However, the construction, operation and security of such facilities is costly—placing a particular burden on academic, research and medical institutions both in the public and private sectors.

It is important to note that Class B and C wastes are largely composed of materials from nuclear power plants, including such items as used filter media and equipment and hardware that are no longer serviceable. These wastes also include materials from academic, government, industry, fuel cycle facilities and medical facilities—primarily in the form of expended radioactive sources. The volumes of Class B and C wastes are a small fraction (less than 0.5 percent) of the overall volume of disposed waste.

No significant health and safety impacts are expected to arise in the near-term as a result of limited availability or shutdown of disposal options for Class B and C wastes. The Nuclear Regulatory Commission (NRC) and its Agreement States will continue to maintain oversight of waste management practices to assure protection of public health and the environment. The Agreement States include the 33 states that have delegated authority from the NRC to regulate certain types of radioactive material. In addition, the NRC has the authority to enable safe disposal of radioactive materials on a contingent basis, if required. But ultimately, universally available options for permanent disposition of the wastes will still be required.

The HPS believes that the Compact approach created by the LLWPA has been unsuccessful, despite some good efforts, such as a proposed facility in Texas. In fact, it appears to the HPS that, in general, the LLWPA has unnecessarily restricted access to available disposal sites and impeded open commercial development of additional disposal facilities. The HPS encourages the Committee to continue to seek information and ideas on how it could more effectively implement, amend or replace the LLWPA to improve access to existing facilities and develop new waste disposition options.

²Low-Level Radioactive Wastes are categorized into Class A, B and C waste as defined in Title 10, Code of Federal Regulations, Part 61.55. The basis for this classification is dependent on the concentrations and identity of specific radionuclides comprising the waste stream. Class A is the least radioactive and least concentrated level, while Class B and C have higher levels and concentrations.

³The 11 Member States of the Northwest and Rocky Mountain Compacts include Alaska, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming.

⁴The Atlantic Compact includes Connecticut, New Jersey and South Carolina.

LACK OF DISPOSAL OPTIONS MAY IMPACT EXISTING FEDERAL PROGRAMS
TO SAFEGUARD SEALED SOURCES

In August 2003, GAO reported to the Senate actions needed to improve the security of sealed radioactive sources.⁵ The HPS commends the efforts of each federal agency that has undertaken significant improvements to impose more stringent security measures to safeguard the control of sealed sources. The additional measures include implementing a federal program for disposing and protecting orphan sources that exceed specific thresholds. It should be noted that many of these sealed sources were orphaned because of the excessive cost of disposal at LLW sites. Because of the levels of radioactivity contained in many of the sealed sources, they must be disposed of as Class B and C waste. After 2008, nuclear facilities in 36 states will be unable to dispose of sealed sources in their possession. The HPS believes that the lack of disposal options for sealed sources may lead to an increase in the number of orphan sources in states that do not have access to either the Rocky Mountain or Northwest Compacts. Therefore, the HPS encourages the Committee to seek additional information to ensure that the existing federal programs for safeguarding high-risk sealed sources are able to carry out this mission.

DESPITE LONG-TERM DISPOSAL OPTIONS FOR CLASS A WASTES,
LACK OF COMPETITION RESULTS IN EXCESSIVE COSTS FOR MANY LICENSEES

The HPS believes that although long-term disposal options for Class A waste are available, lack of competition results in excessive cost to waste generators. As noted in the GAO report GAO-04-604 waste generators are required to dispose of Class A waste at sites in Barnwell, S.C., Richland, Wash., or Clive, Utah. Excessive costs resulting from the limited disposal options have impeded the use of nuclear technologies that provide significant benefits to society. Consequently, the HPS recommends that the Committee seek additional information from industry, regulatory agencies and other stakeholders pertaining to disposal of Class A waste. Additionally, the HPS encourages the Committee to support rulemaking initiatives, which would allow access to as many as 20 Subtitle C hazardous waste disposal sites controlled by the Resource Conservation and Recovery Act (RCRA) for more cost-effective means for disposal of Class A waste.

As the GAO report notes, the current regulatory framework results in excessive and overly restrictive requirements for disposal of Class A low-level waste. A re-examination of certain aspects of this framework may yield new approaches that would increase the number of sites that may safely dispose of Class A low-level waste. In fact, several of these alternatives provide a safe means of disposing of Class A low-level waste in a risk-informed and graded manner. These proposals do not require further legislative actions, but could be implemented within the existing regulatory framework. The HPS believes that such a risk-informed, graded approach is consistent with the recommendations specified by the National Council on Radiation Protection and Measurements (NCRP) Report 139, "Risk-based Classification of Radioactive and Hazardous Chemical Wastes," issued in December 2001. This report incorporates the following principles:

- 1) The classification system is generally applicable to any waste that contains radionuclides, hazardous chemicals, or mixtures of the two
- 2) Wastes that contain hazardous substances are classified based on consideration of health risks to the public that arise from waste disposal
- 3) The waste classification system includes an exempt class of waste.

Implementation of the conceptual approaches contained in NCRP Report 139 should allow land disposal of limited concentrations of radioactive materials at sites that are designed and authorized to contain both hazardous chemicals and radionuclides at a regulated disposal site. The HPS believes that the guiding principals outlined in this report are germane to this hearing and should be considered for seeking solutions to find safe, as well as more efficient and cost-effective means for disposing of LLW.

⁵ GAO Report to the Ranking Minority Member, Subcommittee on Financial Management, the Budget, and International Security, Committee on Government Affairs titled "Federal and State Action Needed to Improve the Security of Sealed Radioactive Sources" (GAO-03-804), issued August 2003.

HPS SUPPORTS AN INTEGRATED FRAMEWORK FOR MANAGEMENT
AND DISPOSAL OF LOW-ACTIVITY RADIOACTIVE WASTE

The GAO report cited studies being conducted by the National Research Council and EPA that consider necessary changes to current LLW thresholds. The GAO noted that changes to this system are under consideration that could affect the amount of waste that must be disposed of in the future.

In November 2003, the EPA published an Advance Notice of Proposed Rulemaking (ANPR), "Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste," that sought input on a wide range of issues related to the possible use of facilities regulated under RCRA for disposal of certain quantities of radioactive materials.⁶ Although the EPA requested comments on the most effective use of RCRA Subtitle C facilities for disposal of Low-Activity Mixed Waste (LAMW), they also requested comment on a variety of wastes regulated under the Atomic Energy Act (AEA). These wastes include certain wastes governed by the AEA, certain waste generated by the extraction of uranium and thorium, a variety of wastes characterized as Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM), and certain types of decommissioning wastes.

The EPA acknowledges that some wastes regulated under the AEA are excluded from regulations as "unimportant quantities" (i.e., source materials containing less than 0.05 percent uranium or thorium), while others are regulated down to the last atom. Additionally, the EPA acknowledged that the current practice of LLW disposal resulted in costly waste management practices and appeared to have an adverse impact on the health care industry to levels that were less than optimal. To address these issues, EPA solicited stakeholder input to find solutions needed to minimize the current practice of imposing dual regulatory authority for controlling disposal of these types of regulated wastes.

Although the EPA requested comments on a variety of issues as specified in the ANPR, the following three questions appeared most important:

- 1) How can the disposal of LAMW be simplified?
- 2) Is it feasible to dispose of other Low-Activity Radioactive Wastes (LARW) in hazardous waste sites?
- 3) What non-regulatory approaches might be effective in managing LAMW and other LARW?

To minimize dual regulatory authority, the EPA acknowledged that such an integrated framework would also require changes to regulations established by the NRC and Agreement States under the AEA. In fact, the EPA noted a similar regulatory approach that has previously been successful in eliminating dual regulations.⁷ This approach required deferral of EPA's authority under RCRA, thus allowing disposal of mixed wastes at sites regulated by the NRC, under Title 10 Code of Federal Regulations, Part 61. The EPA believed that such a rulemaking was justifiable since adequate protection of human health and the environment was ensured under the existing NRC standards. The EPA also stated that both agencies could pursue a similar and compatible rulemaking to further harmonize the management of certain regulated waste streams outlined in the proposed rulemaking. Should such a rulemaking go forward, it would afford the same level of protection. This approach would also reduce the regulatory burdens imposed by two separate regulatory regimes, the EPA said. To support this objective, the EPA would consider proceeding with a rulemaking that would allow disposal of waste streams that contain certain concentrations of radioactive materials at one of the 20 existing RCRA-regulated facilities. However, for this approach to succeed, the NRC must defer its authority under the AEA to allow disposal of licensed materials at sites regulated under RCRA, Subtitle C.

In April 2004, the HPS submitted comments on this rulemaking initiative, commending the EPA for its leadership in embarking on this important task.⁸ As noted in our comments, we believe that disposal of LAMW and LARW at the RCRA sites that follow the mandated engineering design, waste treatment and disposal practices, will ensure protection of public health and the environment. In addition to ad-

⁶Federal Register, "Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule, Volume 68, Number 222," Nov. 18, 2003.

⁷Federal Register, "Storage, Treatment, Transportation and Disposal of Mixed Wastes, Final Rule (40 CFR 266) and Hazardous Waste Identification Rule, Revisions to Mixture and Derived-From Rule, Final Rule (40 CFR Parts 261 and 268), Volume 66, Number 95," May 17, 2001.

⁸Letter from President Ken Kase to EPA, Air and Radiation Docket (Docket ID No. OAR-2003-0095), dated April 23, 2004.

addressing the necessary radiation standards successfully employed to protect human health and safety, our April comments addressed technical issues regarding the movement and fate of radioactive and hazardous materials in the environment. We noted that the movement of radioactive materials in the environment would generally share the same parameters as the chemical compounds of which they are a part, except to the extent that radioactive decay hastens their degradation. We included reference to a report by the California Office of Environmental Health Hazard Assessment that concluded that biodegradation of many RCRA hazardous waste constituents, comprised of heavy metals, are on the order of over 200,000 years, and thus, comparable to many of the long-lived radionuclides. As such, we suggested a concept based on the half-life of chemicals and radionuclides should be considered to better shape the definition of LAMW and LARW.

NRC RULEMAKING PROMOTES A SAFE APPROACH FOR CONTROLLING THE DISPOSITION OF SOLID MATERIALS

The HPS supports the rulemaking for “Controlling the Disposition of Solid Materials” under consideration by the NRC. The HPS also supports the rulemaking under consideration by the NRC to adopt dose-based criteria that would allow for the unrestricted release of sources considered inherently safe.⁹ Moreover, we support establishing dose criteria that would limit individual doses to an effective dose rate of one millirem per year. Establishing dose constraints at such levels are consistent with the recommendations specified in NRC Report 116, “Limitation of Exposures to Ionizing Radiation.”

The HPS also supports use of the annual dose limit and the derived screening criteria contained in the American National Standard Institute/Health Physics Society (ANSI/HPS) Standard N13.12, “Surface and Volumetric Radioactivity Standards for Clearance” (ANSI/HPS N13.12, 1999). This standard was developed for ANSI under the direction of the HPS Standards Committee. The standard received consensus approval through ANSI Committee N13 in August 1999. Moreover, our recommendation is in keeping with the intent of Public Law 104-113 “National Technology and Transfer Act of 1995” and OMB Circular A-119 “Federal Participation in the Development and Use of Voluntary Consensus Standards.”

This position is fully consistent with similar standards adopted by the European Community to support commerce across international borders. The International Atomic Energy Agency developed these radiological criteria,¹⁰ specifying the concentrations of radioactive materials that are considered inherently safe. The basic radiological criteria used by the IAEA to derive radionuclide concentrations for the clearance of materials limited individual doses at an annual effective dose rate of 1 millirem. As a result, international radiological criteria for the release of solid materials are equally as protective to members of the general public as those specified in ANSI/HPS N13.12

The NRC has requested comments on this rulemaking initiative that also pertains to establishing levels of radioactivity that would be unsuitable for unrestricted release, but appropriate for disposal (i.e., “Conditional Release”) at sites regulated under RCRA, Subtitle C. In fact the NRC held a public workshop with stakeholders to address the matter in May 2003.¹¹ During comments on this rulemaking, the HPS encouraged the NRC to conduct early consultations with other federal and state government agencies in support of disposals at RCRA facilities.¹² The HPS believes that these early consultations would better harmonize the relevant regulations and instill more public confidence in the regulatory oversight of LLW disposal.

Should the EPA decide not to proceed with its rulemaking as described in the ANPR, other alternatives should be explored to allow disposal of radioactive materials at RCRA sites within the existing regulatory framework.¹³ Over the past several years, the NRC and EPA have implemented a Memoranda of Understanding that addresses instances where these two regulatory agencies have dual and over-

⁹The HPS provided testimony on this matter before the Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety on March 9, 2000.

¹⁰IAEA Safety Series No. 115 *International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources*, February 1996.

¹¹The NRC requested comments on scope of proposed rulemaking in the Federal Register, “Rulemaking on Controlling the Disposition of Solid Materials: Scoping Process for Environmental Issues and Notice of Workshop,” Volume 68, Number 40, February 28, 2003.

¹²Letter from the HPS to the NRC, Rulemakings and Adjudications Staff, June 13, 2004.

¹³Currently, disposal of licensed materials under the AEA are disposed of at RCRA Subtitle C/D sites on a case-by-case basis in accordance with 10 CFR 20.2002.

lapping authority.¹⁴ This interagency process also could facilitate similar successes whereby the NRC could promulgate a “Conditional Use” rule, which would allow disposal of AEA materials at RCRA Subtitle C sites. Under such a rule, the NRC would defer its authority to EPA to ensure that such waste disposals were conducted in accordance with RCRA, Subtitle C standards.

A NON-REGULATORY ALTERNATIVE TO COMMERCIAL LLW DISPOSAL FOR CERTAIN RADIOACTIVE MATERIALS SHOULD BE CONSIDERED

The HPS believes that solutions pertaining to non-regulatory approaches¹⁵ to more effectively manage LARW are a sound regulatory policy. An approach that involves use of uranium mill tailings for disposal of a select type of Class A LLW (i.e., certain fuel cycle materials) is a logical alternative that should be considered to help ease the LLW dilemma. This approach was jointly proposed by the Fuel Cycle Facilities Forum (FCFF)¹⁶ and the National Mining Association (NMA)¹⁷ as an example of a non-regulatory approach as addressed in EPA’s ANPR.

Disposing of high volume, low activity wastes in uranium mill tailings impoundments offers a number of practical advantages, and the existing regulatory framework can support such an approach. Existing mills have sufficient capacity to accept most, if not all of the fuel cycle industry’s low-activity, high-volume waste well into the foreseeable future. Federal statutes require that mill tailings impoundments be turned over to the Department of Energy for long-term custodial care in perpetuity, at no cost to the government. In addition, federal statutes also require that mill tailings sites be protected for up to 1,000 years with no active maintenance and only passive controls, thereby providing greater protection than that offered by RCRA disposal facilities and existing commercial LLW disposal sites. This disposal alternative can be pursued within the context of existing legislation and federal regulations.

The NRC has a policy regarding the direct disposal of certain radioactive materials at uranium mill tailings facilities. These facilities normally contain waste generated from the processing or concentration of source material, known as 11e.(2) by-product material. The existing policy and guidance that allows for disposal of non-11e.(2) material in mill tailing piles should be amended, and the NRC needs to liberalize its waste acceptance criteria for non-11e.(2) materials disposed in licensed uranium mill tailings impoundments. The FCFF and NMA are pursuing a joint initiative to propose to the NRC active regulatory, political, and economic consideration of using uranium mill tailings facilities for direct disposal of waste streams that are similar to uranium recovery wastes.¹⁸

Beginning in 1992, the NRC developed a policy for the direct disposal of non-11e.(2) byproduct material in such facilities. In a 1998 white paper, the NMA proposed that the NRC liberalize what types of non-11e.(2) materials could be appropriately disposed of in licensed uranium mill tailings impoundments. The NMA recommended that the agency develop generic waste acceptance criteria for such materials. The current joint FCFF-INMA initiative attempts to build on the record developed by the NRC and on the NMA white paper to further refine the debate on this issue.

The history of LLW disposal and the history of the proposed use of mill tailings impoundments for non-11e.(2) disposal lend credibility to the argument that the existing policy on non-11e.(2) materials should be revisited and lays the foundation for this innovative approach. The FCFF/NMA white paper proposes regulatory, political and economic bases for generic waste acceptance criteria that could be debated in the regulatory marketplace among all relevant stakeholders, and subsequently serve

¹⁴T.S. Tenforde, “Future Role of the NRC in Radiation Health Protection,” *Health Physics*, Volume 87, Number 3, pp. 312-317, September 2004.

¹⁵Non-regulatory approaches should be viewed as statutory actions that exist within the scope of an existing framework. Non-regulatory approaches should not be viewed as removal of such wastes from regulatory control or “deregulation of LLW.”

¹⁶The Fuel Cycle Facilities Forum is a consortium of fuel cycle companies whose primary purpose is to provide a forum for addressing regulatory, technical and operational issues associated with the decommissioning of facilities currently or formerly involved in the processing of special nuclear materials and source material (primarily uranium and thorium).

¹⁷The National Mining Association (NMA) represents producers of most of America’s coal, metals, industrial and agricultural minerals; manufacturers of mining and mineral processing machinery and supplies; transporters; financial and engineering firms; and other businesses related to coal and hard rock mining. NMA has member companies who are NRC licensees with uranium mill tailings facilities.

¹⁸In response to the EPA’s ANPR, the FCFF and the NMA jointly submitted a White Paper that espouses the merits of disposal of non-11e.(2) materials in Mill tailings impoundments, and provides a complete and compelling regulatory basis for the option.

as the basis for a technically sound disposal alternative for a large volume of low-activity waste throughout the United States.

A fundamental concern associated with the direct disposal of non-11e.(2) byproduct material in uranium mill tailings impoundments is that, if such material contains RCRA hazardous wastes, it could then subject the entire impoundment to regulation by EPA or delegated states under RCRA. A similar type of jurisdictional overlap might occur if any non-11e.(2) byproduct material containing Naturally Occurring Radioactive Material (NORM) subject to state regulation is disposed of in a mill tailings impoundment. This potential for dual or overlapping jurisdiction raises questions about the eventual transfer of custody of mill tailings to DOE, the long-term custodian. The Uranium Mill Tailing Radiation Control Act of 1978 (UMTRCA) requires Title II licensees to transfer custody of their uranium mill tailings facilities to DOE upon license termination, and DOE is required by Section 83 of the AEA to take the mill tailings and other property necessary for the proper disposal of 11e.(2) byproduct material. Since UMTRCA contains no provision requiring that DOE take custody of, or title to, materials other than 11e.(2) byproduct material, disposal of other materials could, without congressional action, pose an impediment to license termination and transfer of custody to DOE as the long-term steward.

Although DOE is only required to take title to and custody of 11e.(2) byproduct material under UMTRCA, the department has the authority to accept custody of AEA wastes other than 11e.(2) byproduct material under the Nuclear Waste Policy Act of 1980, including non-11e.(2) byproduct material, provided that

- 1) NRC requirements for site closure are satisfied
- 2) transfer of title and custody to DOE is without cost to the federal government
- 3) federal ownership and management of the site is necessary or desirable to protect public health and safety and the environment.¹⁹

Several categories of wastes have already been proposed for disposal in uranium mill tailings impoundments including: secondary process wastes generated during the capture of uranium in side-stream recovery operations; sludge and residues generated during treatment of mine water containing suspended or dissolved source material; NORM, and TENORM. Some fuel cycle facilities have expressed an interest in seeking NRC approval to dispose of special nuclear materials in existing tailings impoundments once the NRC addresses the issue presented in the referenced joint FCFF/NMA white paper. To address these and other issues, the NRC began its inquiry into this matter around a decade ago.

Under the regulations supporting UMTRCA, non-11e.(2) byproduct materials that are disposed of in tailings impoundments would be subject to stringent, ongoing and long-term oversight by the NRC and DOE with regard to both radiological and non-radiological hazards, making these facilities particularly appropriate disposal sites. Moreover, this superior protection would be achieved without the creation of new disposal sites. This approach is also philosophically consistent with the NRC's requirement "to avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations." In addition, this approach would be consistent with long-standing policies favoring disposal over storage of LLW wastes.

RECOMMENDATIONS

The HPS encourages the Committee to consider the following six recommendations as it deliberates on the most effective means to address issues pertaining to LLW disposal:

- Continue to receive information and ideas on how the LLWPA might be more effectively implemented, or amended or replaced, to improve access to existing facilities and develop new waste disposition options.
- Ensure that the existing federal programs for safeguarding high-risk sealed sources have disposal capabilities to allow them to carry out this mission.
- Take a broad look at the manner in which hazardous chemicals and radioactive materials are classified with regard to with the principles specified in NCRP Report 139. Adoption of this recommendation is needed to support a consistent risk-based system for the safe disposition of all hazardous substances.
- Provide the necessary support for the EPA to continue with a rulemaking for an "Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste," as outlined in their Advanced Notice of Proposed Rulemaking.

¹⁹ 42 USC § 10171(b).

- Support NRC actions to promulgate a rule on Controlling the Disposition of Solid Materials. Moreover, should EPA decide not to proceed with such a rule-making, the Committee is encouraged to seek additional information on possible regulatory alternatives to allow use of RCRA Subtitle C sites for disposal of materials regulated under the AEA.
- Encourage the use of non-regulatory approaches that allow for the safe disposal of LLW within an existing regulatory framework.

CONCLUSIONS

The HPS agrees with the majority of the information contained in the GAO report pertaining to management of low-level waste in the United States. The HPS agrees that the Low-Level Waste Policy Act needs to be more effectively implemented, or amended or replaced, to improve access to existing facilities and develop new waste disposition options. We believe that although disposal capacity for Class A low-level waste is sufficient for the foreseeable future, lack of competition currently results in costly waste management practices that impede the use of nuclear technologies that enhance the quality of life of those in our society. Consequently, we believe that several alternatives under consideration by the EPA and NRC may more effectively allow for the safe disposal of certain types of Class A low-level waste.

STATEMENT OF JOE F. COLVIN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, NUCLEAR ENERGY INSTITUTE

Mr. Chairman and members of the committee, I appreciate the committee's continued active oversight of issues relating to civilian use of nuclear technologies and welcome the opportunity to provide the industry's perspective on issues raised in the Government Accountability Office's (GAO's) June 2004 Report on low-level radioactive waste.

The Nuclear Energy Institute (NEI) represents 260 corporate members in 13 countries. They include companies that operate nuclear power plants, design and engineering firms, fuel suppliers and service companies, companies that manage and dispose of low-level radioactive waste, companies involved in nuclear medicine and nuclear industrial applications, radionuclide and radiopharmaceutical companies, universities and research laboratories, and labor unions.

Nuclear technologies offer significant benefits to society. America's nuclear power plants produce 20 percent of the nation's electricity. More than 30 million medical procedures a year use nuclear technologies for diagnosis or therapy, accounting for about one in three hospital admissions. Critical industries use radioactive materials as power supplies, for making measurements and to analyze and test new components and devices. Low-level waste (LLW) is a normal industrial byproduct of these beneficial uses.

The GAO report on low-level waste (GAO-04-604) provides an excellent review and update of the situation on the availability of disposal sites for LLW. The report concludes that the availability is currently adequate, but that the situation could change in the future. As a result, we agree that Congress must remain actively involved in the oversight of the issue.

There are steps that should be taken now to facilitate effective oversight. For instance, we concur with the GAO recommendation that the Department of Energy should ensure that the Manifest Information Management System (MIMS) database contains accurate data. DOE should continue to disseminate the information from MIMS as the agency improves the system.

However, we disagree that it is necessary for the Nuclear Regulatory Commission (NRC) to report to Congress on LLW disposal and storage conditions to ensure that safe, reliable and cost-effective disposal is available. The NRC is a regulatory agency whose expertise and mission focus is on ensuring the safety and security of licensee activities through oversight and inspections. The NRC is not well-suited to study what amounts to future projections related to broad programmatic issues—a responsibility that could dilute the agency's focus on safety and security.

Given that the GAO has studied LLW disposal twice in recent years (1999 and 2004) and has developed an excellent institutional capacity for the subject, we believe that Congress should—at an appropriate future time—request the GAO to perform an updated evaluation.

Low-level waste disposal is currently market-driven within the "compact" framework that Congress provided for in the Low-Level Radioactive Waste Policy Act as amended in 1985. This framework allowed states to form regional compacts for managing their LLW. Producers of LLW have disposed of their waste safely and securely

in several areas of the country. Washington, South Carolina and Utah have operating LLW disposal sites.

The Texas state legislature recently authorized the creation of two waste disposal facilities that will be licensed as one site. On Aug. 4, 2004, Waste Control Specialists LLC submitted a license application for a facility in Andrews County, Texas.

The resolution of two issues is essential with regard to the long-term disposal of the country's LLW: to have adequate access to Class B and C disposal facilities and to address the possibility of a single site for Class A waste by 2008.¹ The market has time to respond to these developments, and we have strong reason to believe that it will.

If the market does not respond or if there are impediments that legislative changes to the Low-Level Waste Radioactive Policy Act could address, then it would be appropriate for this committee to consider action in close consultation with those industries that generate LLW and must address these disposal options.

Disposal of greater-than-Class-C waste is only a problem for decommissioning power plants and is (by law and regulation) tied to DOE actions. Most likely these actions will be linked to progress on the nation's used nuclear fuel repository (for high-level radioactive waste) at Yucca Mountain, Nev., and should not be the focus of oversight on the LLW issue. Although disposal of greater-than-Class-C waste is a separate issue, we recommend continued congressional oversight of DOE's progress in this sector.

Finally, we encourage the committee to support initiatives permissible within the current legislative framework that will enable safe alternative means for LLW disposal. Two such initiatives include an NRC-proposed rulemaking on the safe disposition of solid radioactive material² and an advance notice of proposed rulemaking by the Environmental Protection Agency for the management and disposal of LLW.³

NEI looks forward to working with the committee to ensure that the management and disposal of LLW continues to protect public health and safety.

STATEMENT OF ALAN J. FOHRER, CHIEF EXECUTIVE OFFICER,
SOUTHERN CALIFORNIA EDISON

Mr. Chairman and Members of the Senate Energy and Natural Resources Committee, on behalf of Southern California Edison (SCE), I would like to thank you for this opportunity to express SCE's concern about the current lack of reliable disposal options for low-level radioactive waste. I am the Chief Executive Officer of SCE, a California-based investor-owned electric utility. SCE serves 12 million customers in 450 communities, including almost 300,000 businesses in Southern California. We own a wide variety of electric generation facilities, including hydropower, coal, natural gas, and nuclear. As an owner and operator of the San Onofre Nuclear Generating Station (SONGS) in San Clemente, California, we are especially concerned about low-level radioactive waste (LLRW) disposal.

In June, the Government Accounting Office (GAO) released a report that asserts that (1) there is no disposal shortfall for Class A low-level radioactive waste (LLRW), and (2) that there will be no shortfall for disposal of Classes B and C wastes until mid-2008 when South Carolina will restrict access to the Barnwell disposal facility to Atlantic Compact members only. At that time, the GAO report states that Class A waste disposal will be adequate with the existing license for the Envirocare facility; and that the storage of B and C wastes at the hundreds of sites where the waste is being generated is an acceptable alternative until disposal capacity becomes available. (pages 18-19).

We are here today because we disagree with these conclusions. *We believe that that the Low-Level Waste Policy Act (The Act) and amendments thereto have not resulted in adequate disposal capacity for LLRW.* One of the purposes of the Act was to permit states to band together to provide a local site for the disposal of LLRW. The reality is that such regional facilities for disposal of LLRW have not been created and we are concerned about the long-term lack of disposal for LLRW. We have reason to be concerned as we look at the operational units at SONGS that will need

¹Low-level radioactive wastes are categorized as Class A, B and C waste, depending on the concentration and type of radionuclides in the waste. Based on these criteria, Class A is the lowest rating, and Class C is the highest.

²Federal Register, "Rulemaking on Controlling the Disposition of Solid Materials: Scoping Process for Environmental Issues and Notice of Workshop," Nuclear Regulatory Commission, Feb. 28, 2003.

³Federal Register, Advance Notice of Proposed Rulemaking: "Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment," Nov. 18, 2003.

to be decommissioned in the future. Unit 1 has been shutdown since 1992 and is currently being decommissioned. Units 2 and 3 are due to cease commercial operation in 2022. To date, SCE has removed approximately 15 million pounds of LLRW from Unit 1. We estimate that we have roughly 86 million pounds to remove from Unit 1 before decommissioning is complete.

U.S. Ecology, the private company selected to build a LLRW within California, spent roughly \$90 million in an effort to develop a LLRW disposal facility at Ward Valley, without success. Ward Valley is not unique. In fact, the GAO report states that *“Despite estimates by a nuclear industry association that expenditures may now have reached approximately \$1 billion on various facility development efforts, no new commercial LLRW disposal facility has been developed since passage of the Act, except for the Envirocare facility, which was not developed at the instigation of the compact in which it exists”* (page 9). As a company obliged to meet our public utility obligation to safely dispose of LLRW over the long-term, we find this especially disturbing.

Planning for the inevitable disposal of LLRW must begin now. The GAO based its assessment of the adequacy of disposal on the assumption that few plants will undergo decommissioning over the next 20 years (page 16). In reality, all of the plants will go through this process sooner or later, generating significant volumes of all classes of LLRW.

In California’s case, efforts to identify a potentially suitable site started in 1982. After nine years of extensive site characterization and scientific studies, the California Department of Health Services issued a license. The federal government did not transfer the designated site to California, stymieing the process. The final blow was in 2002, twenty years after work began, when California passed legislation (AB2214) prohibiting the use of the most favorable site—Ward Valley—from being used as a low-level radioactive waste disposal facility. Concurrently, the Governor issued an executive order prohibiting disposal of wastes from decommissioned facilities that have terminated their licensees and are no longer regulated at Class III landfills. This blanket prohibition is imposed regardless of whether the wastes originated in areas previously used for licensed activities. Years of litigation continue to this day, with the California Appellate Court ruling in March 2003 that the company performing the siting and characterization studies could not recover costs from California.

Last year, Texas succeeded in finally garnering enough support to enact legislation allowing for siting and operation of a commercial LLRW disposal facility. Assuming things go smoothly, the earliest that the facility could begin to accept LLRW for disposal is 2008. Under current law and Compact status, only generators from Texas, Maine, and Vermont would be allowed to ship LLRW to that facility.

CLASS A DISPOSAL

We concur with the GAO’s conclusion that disposal capacity for Class A waste will generally be available. After June 30, 2008, the only licensed low-level disposal facility that accepts Class A waste for some 36 states will be a privately operated facility—Envirocare of Utah. Unfortunately, Envirocare does not accept all forms of Class A waste. Moreover, we expect that costs to dispose of LLRW at Envirocare will continue to rise.

Mixed wastes have never been comprehensively addressed under the current LLRW process. The majority of the planning for low-level waste disposal explicitly has excluded mixed wastes at proposed compact facilities. Mixed wastes contain both hazardous and radioactive constituents (typically Class A) and are subject to regulation by both EPA and the NRC. Recognizing the deficit in disposal options for mixed waste, in November 2003 EPA and the NRC initiated efforts to resolve the issue by evaluating the possibility of allowing mixed wastes to be disposed of at Resource Conservation and Recovery Act (RCRA) Subtitle C landfills. These landfills are designed and permitted for disposal of hazardous wastes. As it is currently being considered, allowing mixed wastes to be disposed of at a RCRA-C facility would rely on both the RCRA-C facility operator pursuing the flexibility once it has been developed (at least 3-5 years hence), and on the State in which the RCRA-C facility is located adopting this new federal option.

CLASSES B AND C DISPOSAL

The existing availability of disposal access for Classes B and C waste is limited and requires significant allocation of resources. GAO notes in its report (footnote 17 on page 18) that even though the Barnwell site in South Carolina is still technically accepting all low-level radioactive wastes, including Classes B and C, there is limited space and that space continues to dwindle.

There are no readily apparent options to resolve the lack of access for disposal of B and C wastes after mid-2008. GAO states on page 5 “Unless South Carolina changes its position, or additional disposal capacity is made available, there will not be disposal options for class B and C wastes generated within these [36] states in the longer term.”

The GAO discussed the fact that South Carolina has in the past opened and closed and reopened the Barnwell facility to out-of-compact waste. However, given that current South Carolina law prohibits disposal of LLRW except to those in the Atlantic Compact (Connecticut, New Jersey, and South Carolina) after June 30, 2008, it is not reasonable to consider Barnwell a viable long-term disposal option.

In May 2004, the Utah Hazardous Waste Regulation and Tax Policy Legislative Task Force adopted a motion recommending that state lawmakers not approve the disposal of Class B and C waste within the state, which includes disposal at Envirocare. It is, therefore, not reasonable to assume that disposal of Classes B and C wastes at Envirocare will be a viable long-term disposal option.

Additionally, the GAO noted the possibility of the in-development Texas LLRW site being available for out-of-compact waste. Texas law already restricts the proposed facility's non-compact waste by limiting out-of-state waste to only a small fraction of the total waste deposited each year. It is unreasonable to assume that the Texas LLRW will be a viable long-term disposal option.

Finally, there are transportation-related challenges, particularly with regards to logistics, that make shipments to Barnwell problematic from the West Coast. Some of the low-level waste to be disposed of during decommissioning SONGS 1 will be in the form of large components. The transportation of such large components can be inordinately expensive and logistically complex. If there is no realistic option for regional disposal, then these large components will have to be transported over long distances.

GENERAL COMMENTS

There are impacts associated with loss of access to disposal facilities, some more significant than is portrayed in the report. GAO asserts that they could not detect widespread effects other than costs incurred for extended on-site storage and management. Even if that were true, resources are not infinite. After 2008, when generators in at least 36 states no longer have access to a disposal facility for Classes B and C waste, it will become impossible to fully decommission a facility and terminate the license as long as wastes are stored on-site. Pharmaceutical companies and research universities in California are already finding themselves unable to expand their operations or go about normal business progression because of license termination issues. This situation will only worsen once disposal access is lost. Even if GAO's assertion was true, the resources required for on-site storage and waste-management are limited.

Waste minimization and on-site storage may help to alleviate the lack of disposal capacity but are not long-term solutions nor do they represent viable alternatives for all LLRW. Some medical and research facilities can successfully address part of the LLRW disposal problem by storing the waste on-site until the radioisotope has decayed away to non-detectable levels. This approach is limited by definition to those radioisotopes with relatively short half-lives and cannot be used by the majority of LLRW generators, including SCE. Waste minimization techniques such as volume reduction, source substitution, and changes in manufacturing processes have contributed to steadily decreasing volumes of LLRW for disposal over time, but these techniques are also limited. In many instances, the industry relies on the radioactive properties to achieve its purpose—nuclear power, for example, relies on the fission process to generate heat and provide electricity to the customer. Source substitution is therefore not always an option. Even volume reduction is limited—care needs to be taken as supercompaction of Class A wastes can produce Class B wastes, restricting where the final waste can be sent for disposal.

On-site storage. The GAO report contends that LLRW which cannot be disposed of at a licensed disposal facility can be kept on the site where it was generated. While the NRC currently allows on-site storage without a time limit, this is in part because the NRC recognizes that there is not always a disposal alternative. However, the absence of a time frame for on-site storage does not indicate that the NRC believes permanent LLRW storage where the waste is generated is a feasible long-term plan. The practical effect of licensees being forced to store waste on-site due to the lack of access to a licensed disposal facility is that licensees will be unable to fully decommission the site and, therefore, cannot terminate their operating license or its attendant obligations.

Regardless of which agency tracks volumes of LLRW that has been shipped and/or disposed of, this administrative mechanism does nothing to improve safe disposal options. The GAO spent a considerable amount of space in the report discussing the validity and discrepancies in the MIMS database. While there are errors in the database, many of which were identified and corrected, the focus of the GAO on the inclusion of DOE waste and criticism of DOE's program misses the point of the study—namely, that there is, and will continue to be, commercial LLRW that requires available disposal capacity.

CONCLUSIONS

There is currently no clear path forward that provides predictable and stable disposal options. As a consequence, entities such as SCE, which generate LLRW as a by-product of beneficial uses of radioactive materials, face regulatory limbo. This perpetual limbo will adversely affect the ability of nuclear utilities to maintain or increase the output of low-cost, low-emission electric generation. The result will be higher costs and lower reliability for electric consumers across the board.

The NRC in its comments on the draft report urged GAO to explore alternatives to the current system for developing new facilities. The same comment was made on the GAO's 1999 "Low-Level Radioactive Wastes—States Are Not Developing Disposal Facilities" GAO/RCED-99-238. The GAO did note that the National Research Council and the EPA (in concert with the Nuclear Regulatory Commission) are studying various aspects of LLRW management. The National Research Council has a panel evaluating regulatory and management issues associated with all forms of low activity waste (including NORM, LLRW, DOE waste, source materials, tailings, etc.) That study may make recommendations regarding changes to the regulatory framework but any changes would probably require considerable Congressional action and are many years distant. The EPA activity that is evaluating the possibility of low activity waste disposal in RCRA facilities (or other methods) is also in its infancy, and if any action is taken at all, it will probably only begin with mixed waste management.

While there is no immediate crisis for disposal of low-level radioactive waste, the reality is that years of planning and environmental studies are required before a facility can begin to accept waste for disposal. In California, over a decade of site characterization, testing, and environmental studies that identified the most scientifically suitable site were trumped by litigation, concerted efforts by anti-nuclear organizations, and lack of implementation, at both the state and federal levels. We cannot rely on unknown solutions to this inevitable problem or defer such solutions to some indeterminate future date. We must now adopt a workable process for safe and responsible disposal of low-level radioactive wastes.